The Journal of Pediatrics

VOL. 17 DECEMBER, 1940 NO. 6

Original Communications

PRESIDENTIAL ADDRESS

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OUR time has been called the century of the child. The last ten years can be justly called the decade of the Academy of Pediatrics. The society has now grown to be a live, virile organization composed of the outstanding and representative pediatrists of the United States.

Our annual meeting is being held with a very splendid program of papers, symposiums, and round tables on subjects particularly pertinent to pediatrics. During this year, regional meetings have taken place in Edgewater Park, Washington, D. C., Kansas City, and Seattle, where the programs have approached in scope that of the national meeting. I feel that the regional meetings should not be cramped or hamstrung, especially since they may be as good as the national. It will do no harm to have friendly competition nor to have each meeting better than the last one. We must realize that many members who cannot come to the national meeting are able to attend the regional ones.

We must give everyone something to take home with him, and we must all realize that the average members are not professors with a vast amount of clinical material under their control and supervision, but physicians who are greatly interested in pediatrics, men who are the infantry, the bell-ringers who have always had the desire in life to become better doctors.

Pediatrics has many facets. It is really not a specialty, but the general practice of medicine confined to children. One is supposed to be an authority on everything, disease or condition, that touches a child whether that disease or condition is physical, mental, or social. I sometimes feel it is too much for a brain with only two lobes. We have only to read our program to see what a tremendous field pediatrics covers. Pediatrics is interesting, fascinating, and absorbing. Engaging in an active, successful practice takes a great deal of physical endurance as well as clinical acumen.

Tenth Annual Meeting of the Academy of Pediatrics, Memphis, Tenn., Nov. 16-18, 1940.

The Academy has had many illustrious presidents who have served loyally, men who have had a broad outlook and a splendid grasp of the role pediatrics should play in the medical world. Without doubt, we have an important field. Pediatrics has made more contributions to preventive medicine than any other branch. The former presidents have been the heads of or professors in the pediatric departments of our medical schools and have given time and intelligent thought to the welfare of the organization. They have filled the office with great credit, even though they have been professors; Dean Swift, the author of *Gulliver's Travels*, said that if you wish to destroy your enemy's country send him your professors to help him govern it. The former presidents of the Academy have been men of reputation, with great experience in clinical medicine. They have served as officers in other national societies, have brought to the Academy experience gained in the past, and have filled the executive office efficiently. I feel that the Academy has been remarkably free of medical politics. If there have been some who have thought that a clique or royal family has been running the organization, this situation has been more apparent than real. Members who have accepted office have done so at a great sacrifice of time. Basically, the society belongs to its members, and the men who have been given administrative positions have accepted them as an honor and a trust. They have served only with the interest of the Academy in mind.

This is a democratic country and a democratic society. It is not to be expected that 1,300 members would all be satisfied with all of the policies and methods of the administrative bodies. I am sure the officers would welcome constructive criticism. The growth of the society has been astounding. Its scope and breadth have widened.

It is now the feeling of the present officers that the iron guard should retire and that the offices and committees should be taken over by young blood. There are many members of the Academy who have never had an opportunity to show what they are capable of doing. During the earlier years this was not feasible, but now the time has come to change the personnel. Not precipitately, but gradually, hand-picked, capable young men should be selected to replace the old regime. To take a leaf from the book of the history of nations, this is the best way to avoid senescence. While it has been absolutely necessary to have a central office, which has been ably managed in a very thorough and business-like manner, each region should have and does have carte blanche in running its own affairs, particularly in regard to the type or quality of program its members wish to put on. This should not be changed.

There are many members, whose opinions are shared by some of the regional chairmen, who would like at least a part of the program given over to clinics in which the demonstration is made by an eminent clinician or by the younger men who have given time and thought to a particular phase of pediatrics. The great rank and file of our members are greatly

interested in clinical medicine and enjoy and appreciate seeing a clinic given by an outstanding pediatrist. They take home the memory of a distinguished man. We need not worry about the quality of our programs. There are many new things of absorbing interest that can be presented, as our work covers such a wide field. We may have a little setback when chemotherapy is exhausted or when interest wanes in this subject. It has been featured at many symposiums and round tables and has been given a prominent place on both the regional and national programs during these last few months.

Now that the Academy is well established, we must not adopt a satisfied complex, for that is fatal. Only by being mentally alert can we hope to remain a live organization and not become archaic. There are many lines of human endeavor that the Academy can develop in the future for the welfare and betterment of children.

One of the Academy's most recent committees is for refugee children. The idea that the Academy should have a plan for and interest in unfortunate children who come to the United States from the countries under bombardment originated with Dr. Richard Smith. A committee was immediately formed, with Dr. Borden Veeder as temporary chairman. They worked together during the summer to perfect the arrangements. It seemed at one time that the refugee children would come to the United States in great numbers and that their health and welfare should be under the control of a medical body cooperating with the lay organization, the United States Committee for the Care of European Children. However, as the steamers carrying the children could not be given a safe passage, this wholesale exodus has been stopped, at least for the present. Meanwhile, many hundred children have arrived and have been checked and examined by the Academy's members. This committee at the present time consists of Dr. Philip Stimson, chairman, with the cooperation of Dr. Borden Veeder, vice-chairman, and Dr. Rustin McIntosh, Dr. Carl Laws, Dr. Joseph Walls, Dr. Edwards A. Park, and Dr. Lendon Snedeker.

The Academy is directly responsible for THE JOURNAL OF PEDIATRICS which is undoubtedly one of the best and most practical magazines printed in the field. The editors should have our appreciation and commendation for their discriminate selection of articles printed.

In an address, one cannot go into all the details of the Academy's interests. However, the members of the committees, the chairmen and vice-chairmen of the states and regions, and the program committees are all functioning efficiently, and the Academy is being recognized as the proper organization to carry on with the work of everything that is best for the welfare of our children.

Much has been written about the future of pediatrics. It has been called a poor field with but little material return as compared to other medical specialties, particularly surgery. It is true that the pediatrician

does but little with his fingers and the public is perfectly willing to pay liberally for technical work. The successful surgeon does nothing to discourage this trend. However, the pediatrician has ample opportunity to do lots of thinking, and no branch of medicine offers such an interesting, though strenuous, life with unlimited opportunity to become a really good citizen and an asset in the community. There are few men who have a good medical background, an average set of brains, and a fair amount of industry who cannot make a livelihood in pediatrics. The work of the future, as we see it now, will be of a different type from that of the past, but there are ample opportunities for all.

A celebrated Frenchman once said that there is nothing constant in life except change. And this applies to the world about us, particularly the field of medicine.

When I was graduated in medicine, the atom was considered to be the smallest particle of matter; in fact, the very word atom means indivisible. Now an atom is said to be far more complicated than a Steinway piano. A few years ago Dr. E. O. Lawrence at the University of California made the first atom smasher. At the present time, there are sixteen cyclotrons in the United States. This promises to be a most interesting and fascinating line of human endeavor, and undoubtedly many great and wonderful discoveries will arise from it. I am impressed by the fact that most of the physicists working in this comparatively new field are young men.

Naturally modern medicine owes an enormous debt to the microscope. Without it we would still be struggling in a quagmire of ignorance. The causes of many diseases have been discovered by its use. Without it we would know but little about many major illnesses—malaria, syphilis, pneumonia, tuberculosis, pyogenic infections, and others.

Like many great discoveries, the microscope was developed in a very modest way by a poor, untutored man, Anthony Leeuwenhoek, living in a small town in Holland, a tradesman and later a janitor. He became possessed with the desire to grind lenses, and kept at it until he ground them better than anyone else in all the world. His fellow townsmen thought he was a bit balmy. He became interested in looking through his lenses at small insects and hairs and was amazed at how highly magnified even the smallest object became. Then he mounted two or three lenses in a tube and the first microscope was born, a little over 200 years ago. One day he placed a drop of water under his microscope and was astounded to find it swarming with countless little animals. This was the beginning of the science of bacteriology, which has advanced so far and has done so much to discover the cause of disease.

In the course of time this first crude microscope has developed into an instrument reflecting the highest achievement in optics and lenses that has blazed the trail for many important discoveries. However, it has had its limitations, and it was thought that there were forms of life

which were ultramicroscopic. Some bacteria or protozoa, particularly the viruses, are so minute that it has been impossible to see them with even the highest type of microscope. Now we have a supermicroscope that uses electrons instead of rays of light and magnetic fields instead of glass lenses. The old microscope magnified about 2,000 times. The new apparatus is capable of direct magnification of 10,000 to 30,000 times, with such fine detail that photographic enlargements 200,000 times life-size are possible. Objects can be seen that are but one-fiftieth the size of anything heretofore visible in the highest powered lens microscope. This new discovery is pregnant with possibilities, not alone in medicine, but in industry, chemistry, and physics. Probably, in a few years, many problems concerning virus diseases may be solved. Reports have now been received that two kinds of protein molecules have been seen. It has been demonstrated that some of the viruses are only three times larger than a hemoglobin molecule. This great contribution to increased magnification will solve many of our problems that have been beyond the ken of our highest powered microscope.

We know now that many diseases, notably poliomyelitis, the common cold, measles, smallpox, chicken pox, and mumps, are due to viruses; and we hope that very shortly specific remedies will be found to combat them. Since Dr. Charles Armstrong of the United States Public Health Service has found that poliomyelitis can be produced in cotton rats, a tremendous field is opened for investigation which will be an aid in ascertaining the immunity of human beings. Probably in the near future a specific remedy will be discovered, chemical in nature, that will be the means of curing this terrible scourge of childhood.

Since the organization of the Academy, many great contributions to scientific medicine have occurred and pediatrics has received its full quota from the research workers of the world.

It has been said that in all ages the course of progress has been thought out by the gifted few, while the rate of progress has depended upon the ability of the many to profit by the achievements of the few.

During the last few years the medical world has been given chemotherapy which has revolutionized treatment of many pyogenic diseases. Allergy and immunization have become important factors in the practice of pediatrics. Many contributions have been made to the subject of endocrines. However, much more information is desired. The future will undoubtedly bring us infinitely more authentic knowledge.

One of the most valuable contributions to pediatrics is the improvement in technique in the administration of fluids and blood transfusions. These procedures have saved many lives. The art and ease of taking blood from the veins of children have been greatly simplified. The younger men are adept and skilled in the work. A great deal of information may be obtained from an examination of the blood. It can

be examined bacteriologically, serologically, and chemically, enabling us to make a more correct diagnosis of an obscure case.

A short time ago the milk supply of our cities was produced under unsanitary conditions. It was sold in bulk over the counter of grocery stores, raw, without refrigeration. It was fed to babies and was the cause of thousands of deaths. Pediatrics can justly claim to have been instrumental in the advances made in the development of the modern dairy and the production of a pure milk supply.

The vitamins have come of age. The literature of the discovery, isolation, and synthesis of vitamins reads almost like a romance. Men with brilliant minds and that rarest of all human attributes, imagination, have made epochal contributions to the science of nutrition. The problems of xerophthalmia, rickets, scurvy, pellagra, beriberi, and certain blood dyscrasias have been solved largely by the knowledge arising from the discovery of vitamins. The literature on the chemistry, physiology, and pathology of the vitamins has become voluminous, with new contributions being made constantly.

Man has accomplished so many incredible and wonderful things. It is estimated that he has been on the earth about 500,000 years, naturally at first as a very primitive human being. History began, at the most, only six or seven thousand years ago, but only in the last few hundred years have the great discoveries been made.

As a race we have gone a long way in thought and imagination. The discovery of radium, electricity, x-ray, wireless, and radio, and the achievements in physics, chemistry, astronomy, and allied sciences, are almost beyond the bound of belief.

The human mind is marvelous. Yet politically we have not advanced much further than the Neanderthal man. Evidently there has never been any real wisdom in the conduct of human affairs. We take the great inventions of scientific minds and turn them over to ruthless dictators.

Sometimes it seems so futile for the physicians, with the collaboration of an entire hospital, to patch up old bodies that are worn out with life, or to try to keep alive a premature syphilitic baby who, if he lives, must be sent back to the slums to be often cold and hungry, his playground a refuse heap; while men who are insensible to human or mental suffering can make war and quickly destroy millions of our youth and plunge the world into starvation and grinding poverty for generations.

The meeting of the International Congress of Pediatrics was to have been held this year in the United States in conjunction with this meeting. The European countries which were to send delegates are now engaged in a war to destroy each other. The results of this total war may affect all of us, our way of life and our way of thinking. In Europe the seats of learning and the laboratories that formerly contributed so many discoveries for human benefit and development are now busily engaged

in devising means to exterminate entire populations. War is being waged, not alone on soldiers, but also on defenseless women and children.

We can hardly hope for any notable contributions from European sources for years. In Hans Zinsser's remarkable autobiography he states, "While nations will refuse to cooperate on almost any other issue, they can be brought into the most friendly intercourse by common interest in matters of health. They will tear each other to pieces with high explosives and then take the tenderest care of each other's wounded. Yet in this paradoxical behavior in regard to the wounded lies the influence of the medical profession in all countries of the world who, whatever their minor faults and weaknesses, are conditioned from their earliest training to the complete disregard of the race, religion, political belief, personal virtue or baseness of those needing their help. There may be a little of the spirit of St. Francis in every good doctor."

May we hope that by our common ties of humanity the nations of the earth can again live peaceably together. Let us in America keep the flame of kindness and progress burning. It is the only light left in all the world.

SURGICAL CLOSURE OF THE PATENT DUCTUS ARTERIOSUS

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TODAY the American Academy of Pediatrics awards an E. Mead Johnson Prize for developments in the surgical treatment of the patent ductus arteriosus. Without doubt, the committee desires to encourage a new field of endeavor in pediatrics rather than to commend a single individual who has contributed to it. In these times a physician rarely completes an investigation without the assistance of confrères in the clinic or the laboratory, and it is impossible to accept this award without giving due credit to several men who have collaborated in our studies. Of prime importance have been the vision and enthusiasm of Dr. John Hubbard, who roused my interest in this subject and who carried the work through several troublesome periods with his sound and critical judgment. Next, Dr. Paul Emerson and Dr. Hyman Green have pointed the way to a more accurate diagnosis of the patent ductus arteriosus. Dr. George Wyatt and Dr. Merrill Sosman clarified our knowledge of the roentgenologic changes in these patients, and Dr. Sidney Farber instructed us in the pathology of this and related forms of congenital heart disease. Dr. Elliott C. Cutler has made available to me all the resources of the Laboratory for Surgical Research at the Harvard Medical School. The development of operative techniques on dogs has been an important factor in maintaining a reasonably low mortality rate for the operations in human beings. Furthermore, the establishment of artificial fistulas between the aortic arch and pulmonary artery of dogs has given us experimental animals with shunts similar to the patent ductus, so that we could make physiologic observations on this type of vascular anomaly. Dr. Eugene Eppinger and Dr. C. Sidney Burwell have focused their attention on the abnormal circulatory mechanisms of children and adults with a persistent ductus arteriosus. For the first time, they have quantitatively measured the blood flows in the peripheral circulation, the pulmonary circulation, and through the right and left ventricles before and after ligation of the ductus. Finally, Dr. Kenneth D. Blackfan and Dr. William E. Ladd, respective chiefs of the pediatric and surgical services of the Boston Children's Hospital, have guided the work, at the same time allowing Dr. Hubbard and me a free hand in collecting data and in directing the treatment of these patients. The warm cooperation of such men has made possible a many-sided investigation, and in behalf of this group I wish to thank the American Academy of Pediatrics and the Mead Johnson and Company for the honor which is bestowed upon us.

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E. Mead Johnson Award, American Academy of Pediatrics, 1940.

From The Children's Hospital, the Peter Bent Brigham Hospital, and the Laboratory for Surgical Research of the Harvard Medical School.

RATIONALE FOR SURGICAL ATTACK ON THE PATENT DUCTUS ARTERIOSUS

It is unnecessary to recall to this group that the ductus arteriosus has completed its useful functions when the child is born and that it normally closes when the postnatal circulation has been established. If there is an obstruction at the pulmonary valve, or possibly at the aortic valve, the ductus arteriosus may remain open as a compensatory by-pass. With these complicated cardiovascular abnormalities we are not concerned in the present discussion; our attention at the moment is limited to those persons in whom the patent ductus is the sole lesion or is not acting as a compensatory mechanism.

Strictly speaking, the patent ductus arteriosus is not an arteriovenous communication, but it carries some of the dangers which are known to exist with such fistulas in other parts of the body. In general, these hazards are greater with the patent ductus because it is usually larger and is situated closer to the heart. Because of these two anatomic considerations, the load on the heart and the detrimental effects on the circulation of the body are greater than is the case with most peripheral fistulas. Persons with a patent ductus arteriosus have been known to fulfill a normal life expectancy and to suffer little or no physical incapacitation, yet this lesion is by no means a completely innocuous one. Obviously, a small leak will make but slight inroads on the cardiac reserve and hence produce little or no disturbance. Likewise, a large opening can seriously reduce the cardiac reserve and lead to embarrassment or even failure. As far as the ability of the heart to maintain the general circulation is concerned, the prognosis is probably directly related to the size of the ductal opening in any given case.

If a patent ductus arteriosus does not disturb the cardiac action, it may handicap the growing child in still another way. A shunt which leads from the aortic arch into the pulmonary system where the pressure is low can divert a considerable amount of blood from the peripheral arterial channels. In this manner the peripheral blood flow is diminished below normal and, if the decrease is sufficient, the child's physical growth is stunted. Of course, not all children with a patent ductus are below average normal weight; indeed many of them develop in a perfectly satisfactory manner.

A third hazard which confronts the person with a patent ductus arteriosus is that of subacute bacterial endocarditis or endarteritis of the pulmonary artery. It is well known that any congenitally deformed heart is susceptible to *Streptococcus viridans* infections. It is exceedingly difficult to give any definite figures for the incidence of this condition. Some clinics and physicians have observed small series of cases without any recognized endocarditis, but balanced against this are the numerous case reports of patients who have died with such a complication. The truth must lie somewhere between the two extremes. If patients are observed long enough, at least until the age of 30 or 35 years, probably from 20 to 25 per cent of them will succumb to endocarditis or endarteritis.

Finally, there are rarer sequelae which might be mentioned in passing. These include aneurysmal dilatation of the ductus, rupture of the ductus, and retrograde thrombosis of the ductus, with release of emboli to various parts of the body.

The first three complications enumerated above, namely cardiac embarrassment, failure of the person to develop properly, and the hazard of subacute bacterial endarteritis, are sufficiently common to warrant the risks of surgically closing the ductus. As long ago as 1907, Munro,[17] of Boston, suggested this possibility, but probably it would not be feasible to accomplish the task by the method which he outlined. O'Shaughnessy,[19] of London, was the first to attempt such a therapeutic procedure. Exposing the ductus region, he found that the vessel was already obliterated and that a pulmonary stenosis existed. The next undertaking was by Strieder,[9] of Boston, who operated upon a patient with subacute bacterial endocarditis. For technical reasons it was impossible to obliterate the vessel and the patient subsequently died. It was at this point that Dr. Hubbard suggested that we undertake the study of this entire problem. From these two previous experiences of other surgeons it was evident that more attention must be paid to refinement of diagnostic criteria and to evolvement of a satisfactory surgical exposure of the ductus area. The first question was answered by reviewing material in the congenital heart clinic and the second was investigated by numerous dissections of human cadavers and by practicing operative steps on dogs. While there are still diagnostic problems and obvious inadequacies of surgical techniques, yet it is well to record the advances which have been made to date.

SYMPTOMS

The patent ductus arteriosus may not be accompanied by any symptoms which suggest its presence, or it may give rise to most profound alterations. This difference depends upon the size of the leak and the degree of cardiac embarrassment which has been produced. In the first three or four years of life it is seldom known that the shunt exists unless it is discovered incidentally during physical examination. With increasing exercise of the schooling period, mild or moderate symptoms are common, but are by no means universal. After exercise which is not sufficient to disturb a normal child, there may be slight dyspnea, an increased heart rate, or a pounding cardiac beat. Frank decompensation rarely occurs in children, but it appeared in one of our patients in the sixth year of life. Cyanosis is never found in the uncomplicated case, except in a terminal illness when there is impending death. This observation is explained readily by the fact that the flow of blood through the ductus is always from aorta to the pulmonary artery as long as the aortic pressure is maintained. Some persons are conscious of a "buzz" or a "hum" in their chests, presumably brought about by the eddying and swirling of blood in the pulmonary artery. This disturbance is some-

times noticed by the parent, who can feel the vibration of the child's thorax, and who on occasions may even hear the murmur. Hoarseness has been observed, presumably because of pressure of a dilated ductus on the left recurrent laryngeal nerve.

For some curious reason, the patent ductus is much more common in females.

PHYSICAL FINDINGS

Children with a patent ductus may be of normal height and weight, and indeed may be quite well nourished. However, it is more than coincidence that an appreciable number of them are below par in weight and in general physical development. Fortunately, this retardation does not impair the mental status and the child may be quite bright, alert, and happy. The slender habitus may persist in spite of adequate diet, rest periods, and restriction of activity.

Inspection of the heart may show an increased visible pulsation. There is an augmented thrust, much the same as that which is found in hyperthyroidism. This evidence of enhanced cardiac work is less when the ductus is small and is most marked when the lumen of the ductus is large.

Percussion shows a heart of normal or only slightly increased size. Auscultation reveals a continuous murmur which has a very characteristic coarse and rumbling "machinery" character. It is most intense in the second or third interspace at the left of the sternum and it has a distinct systolic accentuation. The murmur is widely transmitted over the precordium and to the axillae, particularly the left. It is considerably diminished over the neck vessels and it is often heard over the back, especially to the left of the midthoracic spine. Not infrequently, only the systolic part is carried to the apex and to the back. The murmur is quite different from that of pulmonary stenosis, which is harsh and blowing, systolic in time, and is less readily transmitted to the back. The second pulmonic sound often has an increased intensity and snapping quality, a point of some importance in ruling out pulmonary stenosis. In other cases the murmur is so loud that it entirely obscures the pulmonic second sound. A thrill is present in a high percentage of the patients. This again is most intense in the pulmonic region. It is either continuous or systolic in time. It is usually not widely transmitted, but it may be felt in the suprasternal notch or even at the cardiac apex.

Accurate determinations of the blood pressure are of considerable importance. The systolic level is normal or only slightly lowered, but the diastolic reading is likely to be much decreased. In short, the loss of blood from the aortic arch may be sufficient to permit a detectable fall in pressure while the aortic valve is closed during diastole. Presumably, the larger the ductus and the greater the leak, the lower the diastolic pressure. While too much emphasis cannot be placed on this probable relationship, still it is a fact that patients operated upon and found to have ducti from 6 to 8 mm. in diameter had diastolic pressures lowered

only to 50 or 60 mm. Hg, whereas one boy with a ductus fully 11 or 12 mm. in diameter had a diastolic pressure as low as 30 (which indeed was lower than this during some observations). When the pulse pressure is high, a water-hammer pulse appears and "pistol shot sounds" can be heard by direct auscultation over the major arteries of the neck, arms, and legs.

A small proportion of patients may show evidence of frank cardiac failure by physical examination. Pulmonary edema, orthopnea, and occasionally peripheral edema appear.

LABORATORY DATA

These patients do not have polycythemia, such as is commonly observed with the cyanotic forms of congenital heart disease. Blood volumes have not been determined extensively. In several of our cases the volumes were within the range of normal, but in one person it was found to be elevated as much as 20 per cent. The electrocardiograms (Fig. 1) in all thirteen of these surgically treated patients showed no

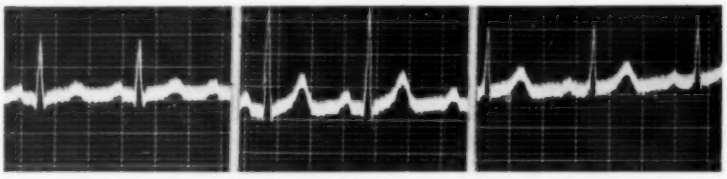

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Fig. 1.—Preoperative electrocardiograph tracings from Case 8. The electrocardiogram shows no axis deviation in the majority of patients with an uncomplicated patent ductus arteriosus.

right axis deviation in any instance, a point which differentiates the condition from pulmonary stenosis. Two of the patients had a slight left axis deviation, but this occurred in adults who had definite evidence of cardiac embarrassment. Therefore, it might be stated that in childhood the electrocardiogram in the case of uncomplicated patent ductus arteriosus is almost always normal and rarely shows any axis deviation. Indeed, the finding of a right axis deviation should immediately arouse one's suspicions concerning the possibility of some other cardiac abnormality.

ROENTGENOLOGIC CHARACTERISTICS

There are several changes which can be detected by roentgenologic examination which aid in establishing or confirming the diagnosis (Fig. 2 and Table I). Films give a considerable amount of information about the cardiac contour. The heart may be slightly enlarged, but this change is not extreme. The cardiothoracic ratio tends to be slightly increased. The pulmonary artery is likely to be somewhat fuller than normal and to bulge laterally toward the left. The lung fields may or may not be congested, particularly at the bases. Right anterior oblique views of the heart may show that the left auricle is enlarged. This is

TABLE 1

PREOPERATIVE ROENTGENOLOGIC FINDINGS (FILM, FLUOROSCOPIC, AND KYMOGRAPHIC STUDIES) IN PATIENTS WITH PATENT DUCTUS ARTERIOSUS

PATIENT	1	2	3	4	5	6	7	8	9	10	11	12	13
Left ventricular enlargement	++	++	++	++	++	0	++	++	++	++	++	++	+
Increased pulsation of left ventricle and pulmonary artery	++	0	+++	+++	++	+	++	–	+	++	++	++	+
Pulmonary artery prominent to left	++	++	++	+	+	+	?	+	++	+++	+	0	++
Pulmonary congestion	+++	++	++	++	++	+	+++	++	++	++	++	++	+
Dilated left auricle	++	+	+	+++	+	–	+	+	++	++	+?	++	+
"Hilar dance"	++	0	0	0	+	0	0	0	+	0	–	0	0
Transverse diameter of heart	11.7	11.6	10.6	12.8	12.5	8.6	11.0	10.0	13.7	10.6	9.6	12.8	9.8
Internal diameter of chest	20.0	18.6	18.1	24.1	21.7	18.0	19.0	17.6	24.6	21.0	15.8	21.4	18.4

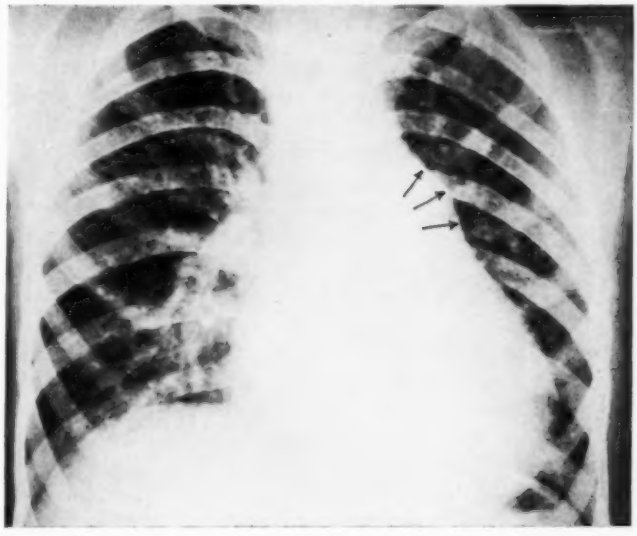

Fig. 2.—Heart film of a patient with patent ductus arteriosus (Case 10). Transverse diameter of heart is 10.6 cm.; internal diameter of chest, 21 cm. There is moderate congestion in the lung fields, particularly on the right. The pulmonary artery, indicated by arrows, is more prominent than in most of these patients.

due to the increased amount of blood flowing through the left side of the heart and is not necessarily indicative of an associated mitral stenosis. Fluoroscopic examination shows an augmented heartbeat and an increased amplitude of expansion and contraction, a fact which can be confirmed by kymographic tracings. Fluoroscopically, the aortic arch and particularly the pulmonary artery have an increased

pulsation; these changes are most marked when the ductus is large. In a few cases there is a visible pulsation of vessels in the pulmonary hili, a so-called "hilar dance." Roentgenologic examination of the heart helps to rule out associated lesions, the most common of which is the interventricular septal defect. A globular heart, with enlargement of the organ to the right, should suggest this possibility. The roentgenologic changes might be summarized by saying that there is nothing diagnostic of a patent ductus arteriosus, but there are four or five variations which are highly suggestive of this lesion and which are confirmatory evidence in establishing the diagnosis.

OPERATIVE TECHNIQUE

In this publication only the major steps of the operative procedure will be outlined. Anesthesia should always be administered with a closed system so that positive pressure can be given whenever necessary while the chest is open. A tightly fitting face mask is all that is necessary; there is no advantage in using an inlying tracheal tube or catheter. Ether and oxygen anesthesia is quite satisfactory, but I prefer cyclopropane when it is available.

The left pleural cavity is opened through a transverse incision above or below the breast (Fig. 3), transecting the pectoral muscles and entering the chest through the second or preferably the third interspace. The costal cartilages of the second and third ribs are cut so that these ribs can be retracted upward and downward if the second interspace is entered, or they both can be retracted upward if the third interspace is used. The lung now collapses away inferiorly and posteriorly and is protected with a moist gauze pack. The mediastinum is entered through a two- or three-inch incision behind the phrenic nerve, running from the lung root up over the aortic arch. The anterior leaf of this pleural flap is best held upward with one or two long sutures. The posterior leaf is now carefully freed so that the vagus and recurrent nerves are brought into view. If the recurrent nerve is always exposed it will not be injured during the subsequent manipulations. There is a variable amount of fat and areolar tissue between the great vessels and around the ductus which must be carefully dissected so that the ductus is not torn. Dissection around the posterior aspect of the ductus must be extremely slow and careful. In most cases the pericardium does not cover the ductus, but in others it completely envelops this structure. When this is true, the pericardium must be opened anteriorly and posteriorly. A malleable aneurysm needle is very useful for fitting in between the curves of the great vessels in different sized subjects. The space between the aorta and pulmonary artery may be so small that at first it seems impossible to obtain any room between these structures. One often gains the impression that the vessels are contiguous to one another and that there is a direct opening between them. However, persistence in the dissection always

shows (at least in these thirteen cases) that there is a ductus of sufficient length to ligate.

Heavy braided (No. 8) silk is now brought into place. Jones and Dolley[15] have suggested the use of $\frac{5}{32}$-inch-wide linen tape such as is

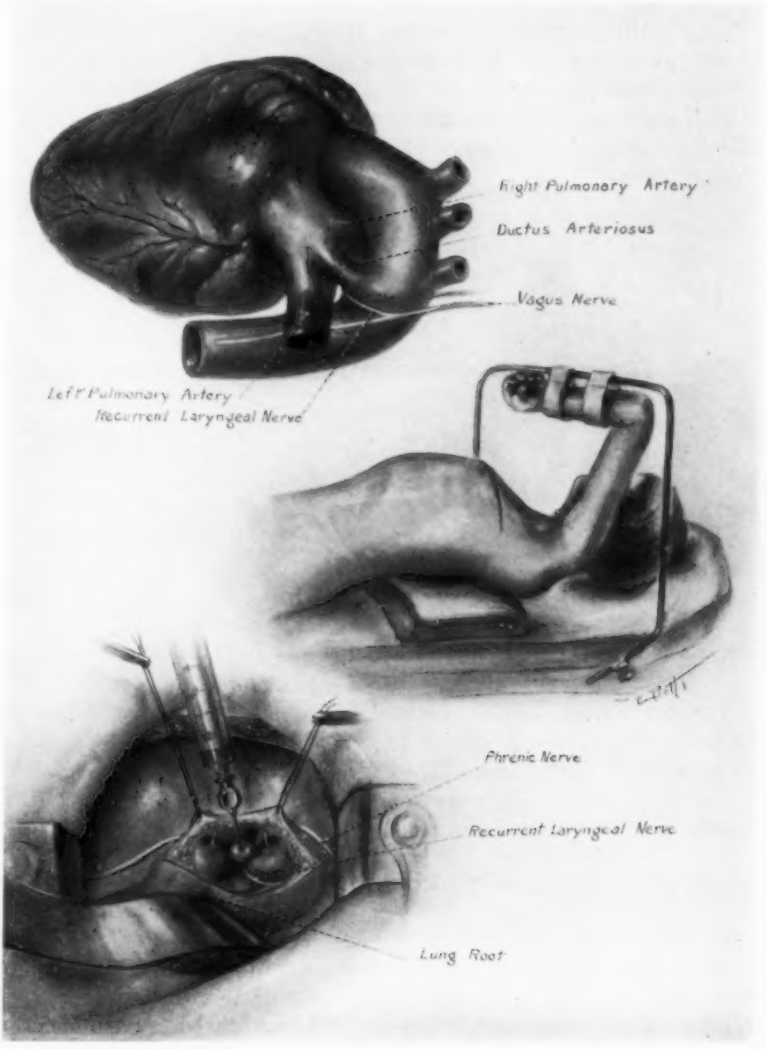

Fig. 3.—Drawing of method for obliteration of a patent ductus. *Above*, position of the great vessels as viewed from the left side of the heart. *Middle*, position of patient on the operating table and site of the cutaneous incision. *Below*, view within the chest. The lung is depressed with a malleable retractor. The ductus has been isolated and doubly tied. A silver clip has been placed on either ligature to prevent the knot from untying. Sclerosing solution is being injected between the ligatures.

employed for tying the umbilical cord of babies. I have used this in one patient and felt that it gave a broad, noncutting surface, and was a very good type of ligature. It is best to employ two ligatures whenever possible, even though they lie rather close together. In this way a short segment of ductus several millimeters in length can be isolated and into this a selerosing fluid such as quinine and urethane can be injected. When the ligatures have been tightened, the operator will at once notice that the thrill has disappeared. Furthermore, the overactive beat of the heart will be considerably diminished. The mediastinal pleura is repaired with a few interrupted sutures, and the lung is re-expanded before the chest is closed.

Fig. 4.—Photograph two weeks after operation (Case 5), to show position of the operative incision.

The reaction to such an operation is a great deal less than might be expected. Morphine is seldom required after the first postoperative day. It is perfectly permissible to allow these patients out of bed in a few days, and indeed, some of them have been sitting up in a chair twenty-four hours after operation. It is necessary to limit the movements of the left upper arm for a period of a week or ten days to permit adequate healing of the transected pectoral muscles.

COMPLICATIONS DURING AND AFTER OPERATION

Anyone undertaking these procedures should be thoroughly familiar with the local anatomy and should be conversant with the vagaries of congenital heart disease. If the surgeon is prepared for anatomic or pathologic variations and is equipped to cope with any emergency that might arise, the operation can be completed with relatively little danger to the patient's life. There are, however, several pitfalls and complications which might be pointed out. Some of these have been

encountered in our own cases; the remainder have come to my attention from various surgeons who have performed operations in other communities.

1. *Failure to Find the Ductus.*—I have not encountered this difficulty, but at least one case has been mentioned in the literature in which the problem arose. A mass of tissue was ligated, and at subsequent autopsy this was found to be a fibrous cord which was adjacent to the ductus; the ductus itself had not been circumvented by the ligatures. An adequate knowledge of the regional anatomy should prevent this mistake. After the mediastinal pleura is opened, a furrow can be felt between the aortic arch and the pulmonary artery. Pressing medially and posteriorly into various parts of this groove with a fingertip will, at some one point, compress the ductus and will make the thrill temporarily disappear. Hence, the operator can quickly determine the site in which the ductus lies before beginning any extensive dissection. Furthermore, the recurrent laryngeal nerve should always be isolated and traced. By doing so, the ductus can be identified just medial and anterior to this nerve as it curves below the aorta.

2. *Ductus Not Long Enough for Ligation.*—Some pathologists and cardiologists have maintained that there are patients with a ductus so short that there is no room to work between the aortic arch and the pulmonary artery. It is said that the great vessels are contiguous to one another and that there is an opening directly between them. This is a pathologist's point of view; the appearance and position of the various structures may bear little resemblance to their configuration during life, when the vessels are distended with blood under considerable pressure. In some of our operations the great vessels lay against each other, and at first it seemed impossible to find any plane of cleavage between them. However, continuation of the dissection anteriorly, posteriorly, and then medially always revealed a ductus which was long enough to permit ligation. This dissection must be painstaking and may require as much as an hour and a half or two hours if it is to be performed with safety and if maximum mobilization of structures is to be obtained.

3. *Hemorrhage From the Ductus.*—The patent ductus arteriosus has a variable thickness and the operator should not conduct his dissection with the belief that the vessel is always as thick as an artery of similar size. It is true that most ducti will stand considerable manipulation and trauma. However, occasional ones are almost as thin as a vein and will rupture if roughly handled. The ductus must never be touched with forceps, clamps, or other instruments which might crush and damage it. It should never be displaced or pulled upon for fear that its medial wall will tear. Instances have come to my attention in which hemorrhage has been uncontrolled and fatal. In every case of the present series a cannula was placed in an ankle vein prior to operation, so that a constant intravenous drip of saline or glucose could be main-

tained. Citrated blood was always kept in the operating room so that it could be given immediately if any emergency arose. This precaution should never be omitted.

4. *Incomplete Obliteration of the Ductus.*—It is difficult to convey to others just how tightly ligatures should be placed. If they are not tight enough, a small opening may be left. While the blood flow through the shunt is thereby reduced to a mere fraction of its previous figure, a softened murmur remains. A sterile stethoscope with a long rubber tube, so employed that there is no question of contaminating the operative field, will allow auscultation directly on the pulmonary artery, and in this way any residual leak can be detected immediately. Blood rushing within the pulmonary artery normally sets up certain sounds, but with a little experience these can be differentiated readily from the sounds produced by a partially open ductus.

5. *Associated Cardiovascular Abnormalities.*—It is possible that the loud murmur and the prominent thrill of an open ductus may overshadow and hide other anomalies. The frequency with which one encounters a second abnormality at operation probably bears an indirect relationship to the thoroughness with which the patient has been previously studied and selected. In the present series a second malformation was found in only one case, and in this instance ligation of the ductus did not embarrass the heart or circulatory apparatus. In other words, the ductus was not acting as a compensatory mechanism. The surgeon must be prepared to recognize at the operating table any unsuspected imperfection in the heart or great vessels. Some of these will be evident from local examination; others can be detected only by the effects on the circulation when the patent ductus is compressed. Therefore, the ductus should be isolated and should then be temporarily obliterated for three or four minutes by a hilar tourniquet or other instrument which will not damage it. Observations can now be made on the changes of the heart action, the peripheral pulse, the pulse rate, the blood pressure, and the color of the patient. If, for any reason, these changes are of a nature which would suggest that permanent ligation of the ductus would be deleterious, the surgeon can terminate the temporary obliteration and can withdraw. If, as in all cases of this series, a temporary compression produces changes which are beneficial, then the ductus can be permanently ligated. In other words, the final decision of whether the vessel will be closed must depend upon the surgeon's observations at the operating table.

6. *Wound Sepsis.*—The only fatality in the present series of cases, and the one death in the similar series of Jones, Dolley, and Bullock,[15] were both caused by a *Staphylococcus aureus* infection in the operative field. The two zones of possible contamination are the cutaneous wound and the mediastinal lymph nodes. Great care should be taken in preparing the skin, particularly at the axillary end of the incision.

If possible, lymph nodes which are found around the great vessels or around the lung root should be strictly left alone for fear that they might contain bacteria. If they must be removed to gain adequate exposure, the instruments which have been employed should be discarded.

7. *Postoperative Pneumonia.*—Bronchopneumonia occurred twice in this series, in the left lower lobe in one patient and in the right lower lobe in the other. It is difficult to say whether these are related to the compression of lung tissue when the chest is open, or whether they are secondary to recent respiratory infections. In our latest few cases, sulfathiazole has been administered for forty-eight hours after operation, with the hope of warding off any pneumonia which might otherwise develop. If the renal function is good, this precaution can be taken without danger and without discomfort to the patient.

8. *Ligatures Cutting Through the Ductus.*—In the efforts to obtain a complete obliteration of the ductus, the ligatures may be placed too tightly. Halsted, Reid, and others have studied at length the problem of obliterating large vessels and have demonstrated that too fine and too tightly applied ligatures may cut through even the largest and thickest arteries. In one of our cases there is evidence that the ligatures have partially cut through, because there was no murmur for several months after operation, but subsequently a portion of the murmur reappeared. The diastolic pressure has not fallen, whereas before operation it had been quite low, and we must assume that the communication has been only partially re-established. Without doubt this complication is one of the weak points of the operation, but with the increasing experience of the individual surgeon, this danger becomes less and less. If the two ligatures are separated as far as possible and are applied with just the right tension, and a sclerosing fluid is injected between them, the chances of re-establishment of the fistula are quite small. This complication is possibly related to the age of the patient. Adults have vessels which are more friable and which may be eroded more easily, whereas children have more resilient and elastic vessels which can be tied with greater safety. This point has been largely responsible for my conviction that the best operative results are obtained in children, prior to the time of puberty.

POSTOPERATIVE OBSERVATIONS

In the present series, thirteen patients, including children and adults, have been operated upon (Table II). There was no mortality during operation, but one person (Case 7) died two weeks later from an extensive *Staphylococcus aureus* infection. Case 6 has derived very little benefit, and unquestionably there is an associated cardiovascular abnormality. (It is well to point out that ligation of this ductus has not been detrimental.) The remaining patients have been improved in one

TABLE II

DATA FROM THIRTEEN PATIENTS TREATED BY LIGATION OF A PATENT DUCTUS ARTERIOSUS

CASE	AGE (YR.)	SEX	RETARDED PHYSICAL DEVELOPMENT	CARDIAC EMBARRASSMENT	CARDIAC FAILURE	DATE OF OPERATION	POST-OPERATIVE RESULT
1	7	F	++	+		8/26/38	Improved
2	11	M	++	++		9/12/38	Improved
3	7	F	++	++		11/ 9/38	Improved
4	17	F		+++	+++	12/22/38	Improved
5	11	F	++	+		8/ 1/39	Improved
6	6	F		+		9/22/39	Slightly improved*
7	15	F	+++	++		10/22/39	Died†
8	5	F	+			12/18/39	Improved
9	26	F		++	++	12/22/39	Improved
10	10	F		++		3/ 8/40	Improved
11	22 mo.	F		+		7/ 3/40	Improved
12	7	M		+		8/ 3/40	Improved
13	5	F		+		9/18/40	Improved

*Besides the patent ductus arteriosus, this girl has some other cardiovascular abnormality and has had only slight benefit from the operation.

†Patient died two weeks after operation from a *Staphylococcus aureus* infection.

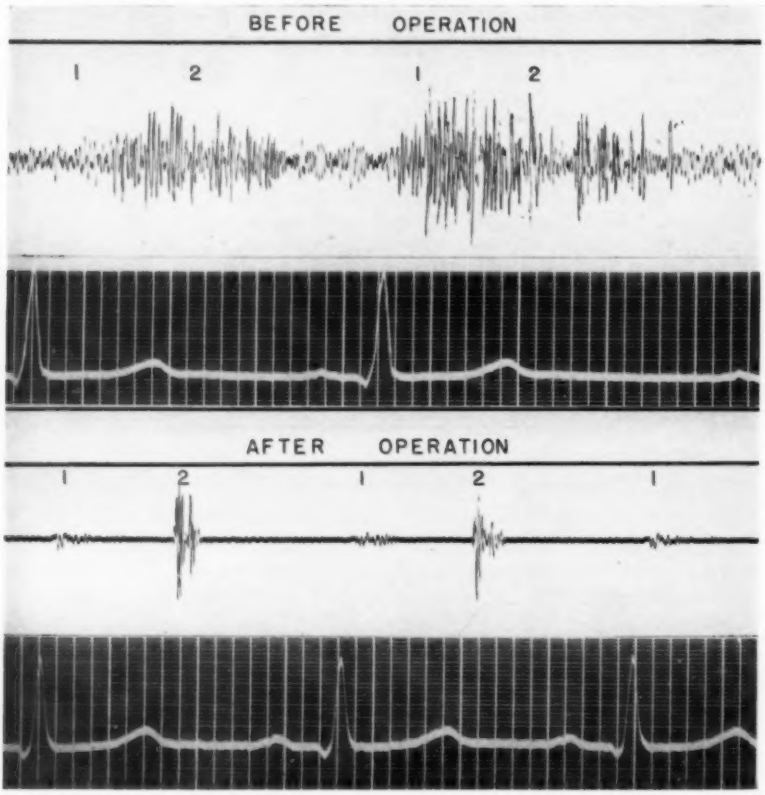

Fig. 5.—Phonocardiograms made from the pulmonic area before and after operation (Case 12). *1* and *2* indicate the times of the first and second heart sounds as determined from the electrocardiographic tracing. Before operation there is a continuous murmur which is most intense during systole. After operation, there is no murmur.

way or another, and rather than present detailed case histories at this time, the changes which have been observed may be summed up as follows:

1. In every patient the thrill has ceased. The murmur in the majority of cases has completely disappeared. In the earlier part of the series, when we were hesitant about placing the ligatures too tightly,

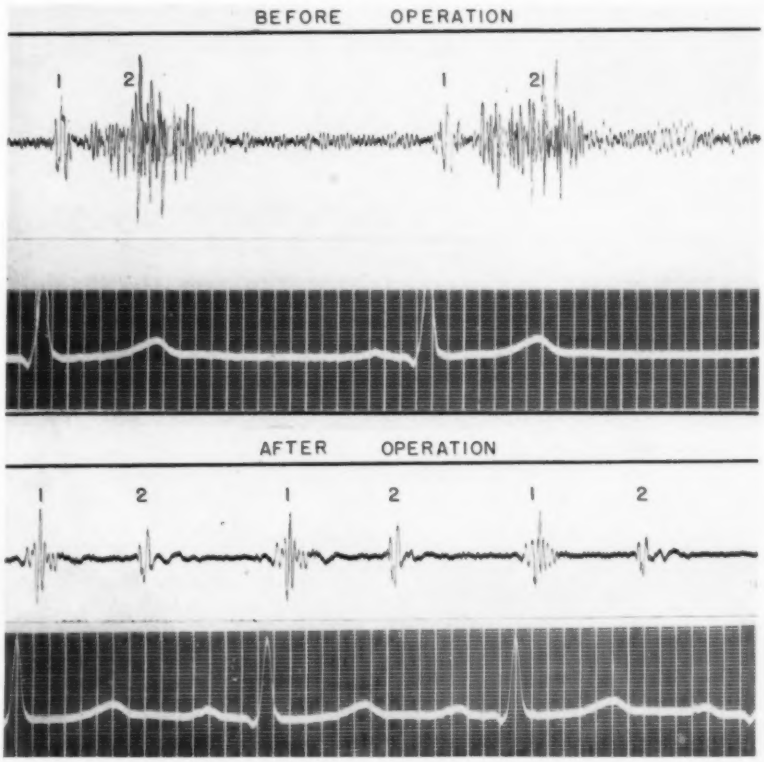

Fig. 6.—Phonocardiograms made before and after operation from the apical area of the heart (Case 12). *1* and *2* indicate first and second heart sounds. Before operation, there is a murmur through systole which extends slightly into diastole. After operation, the murmur has disappeared.

minute leaks were apparently left so that several patients have a residual murmur of greatly reduced intensity. With the more recent technique of double ligatures and sclerosing fluid, we are better able to obtain a complete obliteration and can count on more uniformly favorable results. Graphic evidence of the change in the heart sounds is illustrated in Figs. 5 and 6. These phonocardiograms show vibrations of an intense murmur before operation and complete absence of murmur after operation.

2. The blood pressures have shown distinct changes after operation when compared to the preoperative levels (Fig. 7). In Case 6 there was a rather insignificant elevation in the diastolic pressure, but in all other cases it immediately rose after ligation of the ductus. There was a tendency for the diastolic pressure to increase beyond normal for several days and then to level off to a normal value of around 70 mm. Hg. The systolic pressure did not change appreciably, although in some instances it tended to fall 5 to 10 mm. Hg after operation.

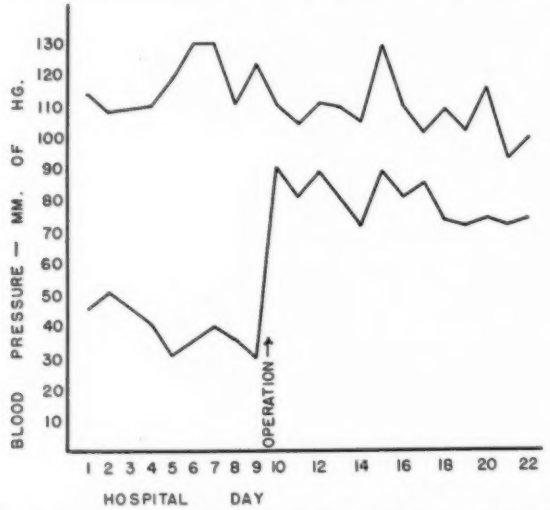

Fig. 7.—Blood pressure chart during hospitalization (Case 1). The diastolic level is low before operation. It rises immediately after ligation of the ductus. The diastolic pressure tends to rise above normal for a few days after operation. It is normal at the time of hospital discharge.

3. The activity of the heart was noticeably diminished after closure of the shunt. In some paients there was an immediate and striking diminution in the forcefulness and amplitude of the heartbeat as soon as the ductus was closed. In others the hypertrophied heart continued to beat with considerable vigor for several days. In general, the activity and excursion of the heart, as shown by physical examination, fluoroscopic observation, and kymographic tracings, were reduced to normal ranges in the postoperative period. These changes were most striking when there had been a large shunt before operation.

4. Children who were retarded in their physical development prior to operation have shown an unexpected and pleasing gain in weight after closure of the ductus. In other words, the peripheral circulation has been stepped up,[7] and the physical development has improved. These physical improvements can hardly be attributed to bed rest, improved diet, or other factors, because most of the patients had been under the guidance of cardiologists or cardiac clinics for several years

before surgical treatment, and general supportive care had failed to produce appreciable weight gains in these particular children.

5. Enlargement of the heart results from hypertrophy, dilatation, or a combination of both. When dilatation has played the important role, the heart has shown a rapid diminution in transverse diameter after closure of the ductus (Fig. 8). More frequently, the major part of

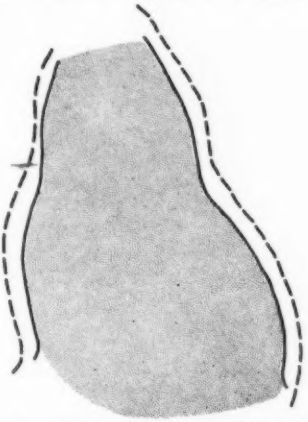

Fig. 8.—Outlines of the heart taken from heart films before and after operation (Case 3). The dotted line shows the contour of heart before operation, and the solid line shows the contour of the heart six weeks after operation.

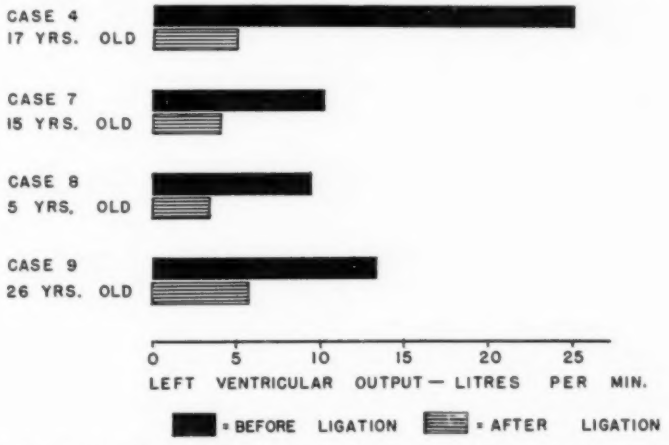

Fig. 9.—Graphs showing blood flow through the left ventricle under the conditions of operation, before and after surgical ligation of the ductus in four patients. The determinations of the left ventricular output were made at the operating table a few minutes before and a few minutes after the closure of the ductus.

the cardiac enlargement was due to hypertrophy, and there was little change in the immediate postoperative period. However, there has now been sufficient time since the first operations to indicate what happens to this type of subject. Whereas the cardiothoracic ratio was

above normal before operation, the heart has grown but little and the thoracic diameter has increased in the year and one-half or two years since operation. Hence, a normal cardiothoracic ratio is finally established, or is approached.

6. The two patients with definite evidence of cardiac failure have had no symptoms of failure since operation, despite the fact that they have carried on greatly increased physical activity. A girl of 17 years (Case 4) who previously had recurring bouts of frank failure has now lived two years since operation without any return of symptoms. A 26-year-old woman (Case 9) whose principal complaint was marked orthopnea for three years is now able to sleep in a horizontal position without any difficulty. Eppinger and Burwell[6] have conclusively demonstrated that the work of the heart is diminished to an extraordinary degree by closing the shunt between the aorta and the pulmonary artery. Some idea of the lessened burden on the heart can be gained from Fig. 9, which shows the left ventricular outputs in liters of blood per minute under the conditions of operation before and after ligation of the ductus. These data will be presented subsequently in greater detail.[7]

COMMENTS

Some of the rationale for surgical attack on the patent ductus arteriosus has been presented. While this persistent vessel may be relatively innocuous for some, it is a serious lesion for others. As long as the surgical mortality and the postoperative complications can be kept at a minimum, there is considerable justification for subjecting patients to operative closure of the ductus. Experience to date shows that worth-while results can be obtained when there has been retarded physical development, cardiac embarrassment, or frank cardiac failure. Whether ligation of the ductus will diminish the incidence of subacute bacterial endocarditis, only the future will tell, but it is reasonable to believe that these infections will be reduced if operations are performed early in life before sclerotic changes have appeared in the pulmonary artery. It is technically possible to perform this operation at any age, but it is best to delay operation in most cases until the patient is 5 or 6 years old, to make sure that natural processes of obliteration will not appear at a belated date and spontaneously close or appreciably diminish the size of the vessel. It is probably unwise to operate on adults after the age of 35 years if there has been no evidence of endocardial infection, cardiac embarrassment, or appreciable limitation of physical activity. The results of operation are apparently better if the ductus is closed in the childhood period when the procedure can be executed more easily, when a better obliteration of the vessel can be obtained, when cardiac reserve has not been lessened appreciably, and when the intimal changes in the pulmonary artery are still minimal.

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THE SIGNIFICANCE OF PROTEIN METABOLISM IN THE NEPHROTIC CHILD

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CHILDREN with the nephrotic syndrome present a therapeutic problem which we may, for convenience in discussion, divide into three components: (1) control of the renal lesion; (2) control of the malnutrition; and (3) control of complications. Since we are ignorant of the etiology and mechanism of progress of the disease, our therapeutic attempts are limited to general measures which, we believe, will promote recovery processes. One of the most important roles in such a regime is played by diet. Time does not permit me to review the important contributions of other workers, but I wish to acknowledge my debt to them. In our studies on patients and animals we observed primarily the relation of protein metabolism to the progress of the renal lesion, to evidences of failure to assimilate nitrogen, and to the incidence of infectious complications. The observations referred to in this discussion were all made while the author was at the Hospital of the Rockefeller Institute in New York.

Despite an extensive literature reporting studies on the influence of diet on the renal lesion in human nephritis, no conclusive data are as yet available on this point.[15] Our conclusions must be drawn largely from the results of animal experimentation, which is subject to the just criticism that experimental nephritis is not identical with the disease seen in the clinic. Nevertheless, we are justified in making some generalizations on the basis of this experimental work. Smadel and Farr,[20] using an antikidney serum, were able to produce an experimental nephritis in rats, which closely simulated the human disease. Farr and Smadel[15, 21] used this nephrotoxic nephritis as an experimental tool to study the effect on an injured kidney of diets with varying proportions of protein and carbohydrate. The results indicated that high protein intakes may favor the development of a chronic, progressive fatal nephritis. Although we cannot translate the results of such experimental work directly in terms of the clinic, we may assume that the injured kidney in the human being will respond qualitatively in the same manner to similar dietary stimuli.

This point is of importance in regard to the nephrotic child since he is generally seen before serious kidney failure has developed. From a consideration of the kidney lesion alone, we became loath to feed very high protein intakes to our nephrotic patients, despite evidence

E. Mead Johnson Award, 1940.
Read before the American Academy of Pediatrics, Memphis, Tenn., November, 1940.
From the Alfred I. duPont Institute of the Nemours Foundation.

that such diets might, at least temporarily, increase the urea clearance in these patients.[2] This made it imperative that we learn how much protein must be fed to a nephrotic child to provide a maximum stimulus to restore tissue and plasma proteins to normal and yet avoid intakes which by excess might conceivably lead to further renal damage. This problem has not been solved, but we have obtained a quantity of data bearing on it.

In a study on the capacity of the nephrotic child to assimilate dietary protein, Farr[3] found that maximum assimilation was not promoted by maximum intake, and that in the average 5-year-old nephrotic child, nitrogen assimilation reached a maximum on a diet furnishing approximately 3 Gm. of protein per kilogram of ideal body weight. When this optimum protein ration was fed, variations in the fat and carbohydrate content of isocaloric diets were without effects on nitrogen assimilation.[5] Further studies[8] on the minimum nitrogen requirements of this group of children indicated that on the average 2.5 Gm. of protein per kilogram ideal body weight were necessary to insure a positive nitrogen balance. This increased minimum requirement could not be attributed to increased basal requirements.[4] Observation periods up to six years of nephrotic children in the Rockefeller Institute Hospital clinic have shown that, when a 5-year-old nephrotic child was maintained on a protein ration between 2.5 and 3 Gm. per kilogram ideal body weight, there were no evidences of deleterious effects upon the kidney function. From a renal standpoint, dietary protein at this level in a young nephrotic child may be considered as safe.

However, we soon found that feeding a child optimum protein diets did not regularly result in a rise in plasma protein concentration even though the child could be demonstrated to be free of edema[16] and in a state of positive nitrogen balance.[5] Apparently, the nitrogen assimilation had been increased sufficiently to satisfy requirements for growth, but the child was still unable to advance to a normal status of plasma and tissue proteins. We also learned that acute clinical episodes, which were frequently accompanied by pneumococcus bacteriemia and peritonitis, were almost uniformly preceded by a period of from one to two weeks during which the child was in a state of negative nitrogen balance although the diet remained optimal.[6] This condition of accelerated nitrogen loss simulated in many ways that observed in recognized toxic conditions, and, for convenience, such states in which a negative nitrogen balance existed in a nephrotic patient with an adequate intake of dietary protein were characterized as those of "toxic" nitrogen metabolism, with the important reservation that *no assumption was made concerning the cause of the accelerated nitrogen excretion.*[7] Thus, we began to find evidence that, in the majority of instances, what we had believed to be "pure" complications occurred only after a well-defined change in the child's ability to assimilate

nitrogen and that they might be more properly considered as an integral part of the disease itself. This, however, did not explain the explosive nature of these episodes which we have termed "nephrotic crises."[6] Originally, the term nephrotic crisis was limited to attacks of acute clinical illness presenting the same symptomatology as pneumococcus peritonitis in these children, but without demonstrable infection. On the basis of subsequent observations, as will be evident below, it appeared more logical to speak of both the infectious and apparently noninfectious attacks as "nephrotic crises" and to qualify them as with or without demonstrable infection. I shall so use the term in this discussion.

With the development of the concept of nephrotic crisis, we began to clarify the relation between exacerbations of disturbances in nitrogen metabolism resulting from the disease and the development of some infectious complications. Such infections, we already knew, were in the majority of instances not the result of invasion by a new organism.[19] We also knew that these episodes were most likely to occur in children with a plasma albumin below 1 per cent and that in several instances a sudden increase in proteinuria had apparently been a precursor of the attack. Study of the nitrogen balance during acute episodes had revealed the surprising fact that nitrogen loss which developed from one to two weeks before the episode was not accelerated during attacks.[6] Although the plasma albumin usually decreased sharply during an attack, it did not parallel the clinical manifestations. Furthermore, transfusion therapy which furnished an extra supply of plasma proteins to the patients did not alter the outcome.

We had at this time begun a study of the plasma amino acids in these patients in a further attempt to seek out an explanation for persistent hypoproteinemia even in the absence of proteinuria. Although earlier studies of the blood amino acids had shed no light on the problem,[17] the determinations had been made chiefly on blood from adults, and no children in crises had been observed. Also, the development by Van Slyke, Dillon, and MacFadyen[22] of the highly specific ninhydrin-carbon-dioxide method for determination of alpha amino acids and the adaptation of this method to blood and urine by MacFadyen and Van Slyke[18] gave us hope that, with greater analytical accuracy and specificity, variations in results could be interpreted with more confidence. We now began a series of studies on amino acid physiology. As a result of these observations, we found a hitherto undescribed disturbance of amino acid physiology in nephrotic children.[13] These patients exhibited a persistent plasma hypoaminoacidemia during the period of disease. Variations in amino acid nitrogen content of the red blood cells did not conform to any regular pattern, and we were unable to correlate cell amino acid nitrogen with the course of the disease.[13] In addition to the chronic plasma amino acid deficit,

there occurred acute hypoaminoacidemic crises accompanied by severe clinical manifestations when the level of plasma amino acid nitrogen determined by the ninhydrin method fell below 2.5 mg. per 100 c.c.; this value we have termed the critical level. The development of severe hypoaminoacidemia accompanied and paralleled the clinical explosion of the nephrotic crisis; the abrupt fall in plasma amino acid nitrogen value occurred at the onset of the clinical symptoms, and the sharp rise to above the critical level attended the sudden recovery in these patients.[13]

The variation in the plasma amino acid nitrogen concentration during crises followed the same pattern whether or not the crisis was accompanied by demonstrable infections. Consequently, we redefined a nephrotic crisis in terms of the plasma amino acid concentration. A nephrotic crisis is said to exist whenever the plasma amino acid concentration falls below the critical level of 2.5 mg. per 100 c.c. and to have ceased when the value has risen above this figure. When bacteriemia and peritonitis accompanied the crisis, the profound hypoaminoacidemia persisted for a longer period than when there was no demonstrable infection.

These observations immediately suggested the possibility of specific amino acid therapy in this affection. Fortunately, at this time Elman[1] demonstrated that amino acid solutions could be given intravenously to nonnephrotic patients, without harmful effects. We obtained an enzymatic casein hydrolysate* and began to study the effects of intravenous administrations on the nitrogen economy of the nephrotic children. The technique of preparation and administration we used has been previously described.[7, 10] As a result of three years of experience with this therapeutic procedure, we have obtained certain basic data: Casein hydrolysate injected intravenously was not excreted in the urine, but was retained and utilized.[12] We were unable to influence the chronic hypoaminoacidemia in these patients by intravenous administration of casein hydrolysate even though amounts up to 2.25 Gm. of amino acids per kilogram ideal body weight per day have been given to 7-year-old nephrotic children on alternate weeks for as long as four injection periods.[10] Replacement of up to 57 per cent of dietary protein nitrogen with nitrogen furnished by casein hydrolysate given intravenously increased slightly the efficiency of nitrogen assimilation on a constant nitrogen intake and within this range of substitution indicated that casein hydrolysate completely replaced dietary protein.[10] In one series of observations, by previous injection of amino acids we were able to increase the assimilation of nitrogen on high protein diets to a degree well beyond that obtained when no amino acids were given prior to the high protein feeding. When the high nitrogen intake was provided by intravenous amino acids in addition to a diet of 3 Gm. of protein per kilogram, a similar increase in nitrogen assimilation was

*Furnished through the generosity of Mead Johnson and Co.

found.[7, 10] Despite the fact that nitrogen assimilation could be increased, we have as yet been unable to influence the hypoproteinemia. We have not experienced any severe reactions in our patients. Certain other physiologic effects of intravenous amino acid injections have been discussed previously.[7, 9, 10]

The most significant therapeutic results with intravenous amino acids have been obtained in the treatment of nephrotic crises with infection. Prior to our use of intravenous amino acids in the treatment of these episodes, we administered highly potent type specific antipneumococcus rabbit serum. Over a three-year period in nine patients under 12 years of age, with ten episodes of pneumococcus bacteriemia, the mortality was 66 per cent, and but one of these patients survived more than two crises with infection. During the next three-year period we continued the same treatment of crises with infections and added intravenous amino acids. Administration of casein hydrolysate intravenously was started immediately at the inception of a crisis, and from three to four injections were given daily until recovery from the crisis, as evidenced by a rise in the plasma amino acid nitrogen to above 2.5 mg. per 100 c.c. In a group of eleven patients under 12 years of age, we have thus treated ten episodes of pneumococcus bacteriemia. No chemotherapy was used at any time. In this group several patients with pneumococcus bacteriemia received no serum whatever, only intravenous amino acids being used. Our mortality has been zero in the group of patients under 12 years of age treated with intravenous casein hydrolysate. In addition to pneumococcus bacteriemia, in this group have been patients who have had nine crises complicated with *B. coli, H. influenzae, H. streptococcus*, Groups D and H, and *B. morgani* bacteriemia in which the sole therapy was intravenous amino acids; these patients recovered without a fatality. Two patients who developed hemolytic streptococcus Group A bacteriemia, one of them with 200 colonies per cubic centimeter of blood, were treated with sulfanilimide and intravenous amino acids, without a fatality. We are unable to explain on the basis of our observations why such an effect should be obtained, since we did not shorten significantly the course of the crisis by such therapy. Despite the fact that we did not immediately influence the level of the plasma amino acid nitrogen by intravenous casein hydrolysate, we believe this striking reduction in mortality of patients in crises with infections to be a most significant therapeutic test of the relation of amino acid metabolism to nephrotic crises.

At this time, therefore, it would appear that our efforts to control the malnutrition of these patients and to control the complications may be achieved, at least in part, by the single attempt to restore the protein metabolism to a more normal state. The apparent relation between nitrogen metabolism and infection in nephrotic children led us to investigate other disease states to determine whether hypoaminoacidemia was limited to the nephrotic syndrome or whether it might

be a basic manifestation of various disease states. We have had opportunity as yet to observe only a few other conditions. In pneumococcus pneumonia we have found an acute hypoaminoacidemia which lasts for the duration of the acute disease. In pneumonia patients, the plasma amino acid nitrogen concentration rose to a normal value during convalescence, usually within five days after crisis.[14] When complications, such as empyema, developed, the plasmo amino acids failed to return to their normal value although slight improvement usually occurred over the hypoaminoacidemia seen in acute pneumonia. In a group of patients with scarlet fever and measles, only rarely was hypoaminoacidemia encountered.[11] We have seen hypoaminoacidemia in a few other obscure diseases in which infection played no role. The evaluation of these observations awaits further study which we are prosecuting as rapidly as possible.

The significance of a study of protein metabolism in the nephrotic child thus may be seen to be not limited to that attending a curious anomaly seen only in the nephrotic syndrome, but possibly to be of basic importance in our understanding of the relation of certain aspects of protein metabolism to many disease states.

SUMMARY

The significance of disturbances in protein metabolism known to exist in the nephrotic syndrome has been discussed.

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THE CHEMOTHERAPY OF STAPHYLOCOCCIC INFECTIONS

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IN PREVIOUS publications[1] it was shown, by using the marrow culture technique,[2] that neoarsphenamine and sulfathiazole were very effective in controlling *Staphylococcus aureus* infections, that the optimal concentration of neoarsphenamine was 1:150,000, that one-half of this concentration was relatively ineffective, and that twice this concentration damaged living, human, marrow cells. Sulfanilamide was relatively ineffective, and sulfapyridine was only slightly effective. Sulfamethylthiazole was almost as effective as sulfathiazole, but its use has been discontinued because of its reported tendency to produce polyneuritis.

In this paper, further marrow culture studies are reported; a method of giving neoarsphenamine to maintain a uniform concentration is outlined; and suggestions for use of and preliminary clinical results with these drugs are given.

MARROW CULTURE STUDIES

In each experiment about 50 c.c. of culture containing about 100,000,000 living human cells in a vaccine vial was inoculated with the organism to be studied, and after thorough mixing a sample was removed for an initial pour plate colony count. Equal volumes, usually about 8 c.c., were transferred to each of four to eight 30-c.c. vaccine vials. To each of these except the control the desired concentration of the drug or drugs to be studied was added. The vials were then placed in the incubator at 37° C., and at intervals samples were removed from each for pour plate colony counts and smears. This technique insures that all cultures are identical except for the drug purposely introduced, and that there is nothing present, except the drug, which is not present in the human body. There is no absorption or excretion, so the drug concentration remains the same throughout the experiment. Examples of the results obtained are shown in Tables I and II in this article, as well as in the tables and illustrations in the articles previously cited.[1]

In Table I, note that even the suboptimal concentration of 1:200,000 neoarsphenamine was superior to any of the concentrations of sulfathiazole investigated, that there was very little difference in effectiveness with concentrations of 5 mg., 7 mg., and 10 mg. per 100 c.c. of sulfathiazole, and that the combined use of neoarsphenamine and sulfathiazole was definitely superior to either one alone. Note also

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Read before the Tenth Annual Meeting of the American Academy of Pediatrics, Memphis, Tenn., Nov. 18, 1940.

TABLE I

COMPARATIVE EFFECTIVENESS OF NEOARSPHENAMINE AND VARYING CONCENTRATIONS OF SULFATHIAZOLE AND COMBINATIONS OF THE TWO DRUGS ON HEMOLYTIC STAPHYLOCOCCUS AUREUS*

HOURS	0	23	46	70
Control	225	300,000,000?	660,000,000	
Neoarsphenamine, 1:200,000	225	470	9,800	260,000
Sulfathiazole, 5 mg. per 100 c.c.	225	4,000	140,000	1,400,000?
Sulfathiazole, 7 mg. per 100 c.c.	225	8,600	520,000	1,300,000
Sulfathiazole, 10 mg. per 100 c.c.	225	7,700	730,000	700,000?
Neoarsphenamine, 1:200,000, plus sulfathiazole, 5 mg. per 100 c.c.	225	1,200	46,000	1,560,000
Neoarsphenamine, 1:200,000, plus sulfathiazole, 7 mg. per 100 c.c.	225	550	300	130
Neoarsphenamine, 1:200,000, plus sulfathiazole, 10 mg. per 100 c.c.	225	1,200	830	460

*Colonies per cubic centimeter.
? = Computed from pour plates with less than 20 or more than 500.

TABLE II

COMPARATIVE EFFECTIVENESS OF NEOARSPHENAMINE AND VARYING CONCENTRATIONS OF SULFATHIAZOLE AND COMBINATIONS OF THE TWO DRUGS ON HEMOLYTIC STAPHYLOCOCCUS AUREUS AGAINST LARGER INOCULATIONS OF THE SAME ORGANISM AS SHOWN IN TABLE I*

HOURS	0	21	44	69
Control	1,500	650,000,000		
Neoarsphenamine, 1:200,000	1,500	220,000	13,100,000	20,000,000
Sulfathiazole, 2.5 mg. per 100 c.c.	1,500	670,000	15,800,000	
Sulfathiazole, 5 mg. per 100 c.c.	1,500	210,000	1,400,000	11,600,000
Sulfathiazole, 10 mg. per 100 c.c.	1,500	330,000	610,000	1,400,000
Neoarsphenamine, 1:200,000, plus sulfathiazole, 5 mg. per 100 c.c.	1,500	24,600	13,300	4,700
Neoarsphenamine, 1:200,000, plus sulfathiazole, 10 mg. per 100 c.c.	1,500	16,800	11,000	4,000

*Colonies per cubic centimeter.

that an appreciable time was required for the action of these drugs and that, when both drugs were used in combination, the colony counts were still decreasing at seventy hours.

In Table II, in which the use of a larger inoculation of the same strain of organism is recorded, note that the drugs were less effective against larger numbers of organisms than against a smaller number, that sulfathiazole in a concentration of 2.5 mg. per 100 c.c. was effective but not as effective as it was in higher concentrations, and that the combination of neoarsphenamine and sulfathiazole on this larger inoculation was also more effective than was either drug alone.

Many similar experiments were performed using different strains of hemolytic and nonhemolytic *Staphylococcus aureus*. Against all of these strains in marrow cultures neoarsphenamine in concentrations between 1:100,000 and 1:200,000 was effective, as was sulfathiazole in concentrations between 2.5 and 10.0 mg. per 100 c.c. In all instances a concentration of 5 mg. per 100 c.c. of sulfathiazole was superior to one of 2.5 mg. per 100 c.c., but there was little difference in effectiveness in the range from 5 to 10 mg. per 100 c.c. Neoarsphenamine in a concentration of 1:200,000 was sometimes less effective and sometimes more effective than sulfathiazole. The combination of the two was sometimes more effective than either alone, sometimes equally effective with the more effective of the two drugs, and sometimes intermediate in effectiveness between the less and the more effective drug. The combination of the two drugs was no more toxic to the marrow cells than was either drug alone.

From these marrow culture experiments it was impossible to say, therefore, which of the two drugs will prove most effective clinically or whether the combination of the two will prove superior to either one alone.

DOSAGE

From the marrow culture studies it was determined that the ideal concentration of neoarsphenamine was 1:150,000; this would correspond to about 130 gamma of arsenic per 100 c.c. of blood. Through the courtesy of Dr. Raulston, Dr. Magnuson, and Dr. Chaney of Los Angeles, who made arsenic determinations by the method of Chaney and Magnuson[3] on blood samples from patients to whom I was giving neoarsphenamine, it was determined that this concentration could be maintained by giving four unit doses of neoarsphenamine the first day, intravenously, at four- to five-hour intervals, and three such doses a day at eight-hour intervals thereafter. The simplest way of calculating the unit dose in grams of neoarsphenamine is to multiply the body weight in pounds by 0.0008. It is much simpler to give neoarsphenamine in three intravenous injections a day than to give it by the intravenous drip method. It is not yet known with certainty how long this dosage should be continued. I have given it for three consecutive

weeks, without evidence of toxicity, but it is probably better not to continue it longer than ten days without a rest period. This has proved long enough in the acute staphylococcic infections treated thus far, since marked clinical improvement usually occurs within twenty-four to seventy-two hours. The administration of the drug should be continued for at least a week after the temperature is normal and the cultures are negative, if this period does not exceed ten days.

Blood determinations[4] seem to be the only way of controlling the level of sulfathiazole therapy with any degree of accuracy, because of the variability of the absorption of sulfathiazole. In adults I use an initial dose of 2 Gm., with 1 Gm. every four hours day and night, varying the dosage as necessary to maintain the blood level between 5 and 10 mg. per 100 c.c. Double this dosage may be given on the first day to the most seriously ill patients. The dose should be reduced correspondingly in children. I have noted distinctly less toxicity at the lower levels, so it is recommended that the concentration in the blood be kept at 5 to 8 mg. per 100 c.c. except in the most seriously ill patients.

TOXICITY

The toxicity of both drugs is too well known to require detailed comment, but it must be borne in mind that the toxic effects appear to depend more on individual idiosyncrasy than on the blood levels of the drugs within the range recommended. It is extremely important, therefore, to see every day patients who are receiving these drugs and to examine them for evidences of toxicity, as well as to have daily routine hematologic studies to detect the onset of agranulocytosis or hemolytic anemia. It is also important to weigh the seriousness of the underlying disease against the seriousness of the toxic manifestations in deciding whether or not to discontinue the drug.

SUGGESTIONS FOR CLINICAL USE

It is evident that a large series of patients with each of the known types of staphylococcic disease must be studied and the effects of therapy with neoarsphenamine alone, sulfathiazole alone, and the two in combination must be compared before accurate clinical appraisal is possible. From a theoretical standpoint, each drug has certain advantages. Sulfathiazole may be taken by mouth, which is more convenient for the less seriously ill patients. Neoarsphenamine must be given intravenously: this insures a rapid attainment of an adequate blood level and is an advantage in comatose and other seriously ill patients; furthermore, vomiting will not prevent the attainment of an adequate blood level. Some patients who have an idiosyncrasy to one of the drugs may tolerate the other.

In acute osteomyelitis with bacteriemia, John and Edward LeCocq,[5] who first suggested to me this study of neoarsphenamine, have lowered the mortality from 86 to 23 per cent by the use of neoarsphenamine,

even though many of their patients were treated before the proper dosage to maintain the optimal blood level was determined. In acute fulminating staphylococcic infections, such as bacteriemias, pneumonias, and meningitis, it seems from the data now available that it is better to give both drugs, except in very large institutions with adequate facilities for carefully controlled studies where comparisons of the effectiveness of either drug alone and the two in combination should be made. Sulfathiazole, possibly supplemented with short courses of neoarsphenamine with rest periods in between, would seem to offer the most promise in chronic staphylococcic infections; but in all probability neither drug will prove effective in such infections without surgical drainage to diminish the number of organisms in any local collection of pus. Both drugs have proved effective in staphylococcic infections in the urinary tract,[6] but sulfathiazole would appear to be the drug of choice for the first trial. This is probably true also for furunculosis and for other minor staphylococcic infections.

CLINICAL DATA*

No series of cases from which statistical conclusions of any value can be derived are yet available. At my suggestion, thirteen cases of serious staphylococcic infection have been treated with one or more of these drugs.

Five patients with proved staphylococcic bacteriemia have been treated, three with neoarsphenamine alone, and two with neoarsphenamine and sulfathiazole. All the patients treated with neoarsphenamine alone and one of those treated with neoarsphenamine and sulfathiazole recovered. One of the patients who recovered with neoarsphenamine alone showed multiple areas of induration and discoloration at the time therapy was started; these disappeared without progressing to definite abscess formation and without lancing. The patient treated with neoarsphenamine and sulfathiazole who died showed multiple abscesses throughout the organs at necropsy.

One patient with staphylococcic bacteriemia was treated with neoarsphenamine, sulfathiazole, and sulfamethylthiazole before the proper dosage of neoarsphenamine had been determined. This patient, an 8-year-old girl, was brought into the Doernbecher Memorial Hospital for Children in extremis after six days of fever reaching 105° F. each day. Her temperature was 107° F. shortly after admission, and she appeared moribund. She was given neoarsphenamine by intravenous drip for about eight hours, and her temperature dropped to 101° to 102° F. the following day. Neoarsphenamine was given in small doses on three subsequent occasions, but each time too long an interval was allowed to elapse between courses. She was also given sulfathiazole

*I am indebted to Dr. J. B. Bilderback, Dr. E. G. Robinson, Dr. R. H. Keane, and Dr. R. Matson of Portland; to Dr. D. H. Findley and Dr. A. J. Loeffler of Medford, Ore.; to Dr. R. M. Overstreet of Eugene, Ore.; to Dr. G. A. Moosey and Dr. W. H. Goering of Tacoma, Wash.; and to Dr. J. M. Askey and Dr. E. R. Ware of Los Angeles for permission to mention these cases.

and sulfamethylthiazole, but because of vomiting, adequate blood levels were not attained. Neoarsphenamine was discontinued on the sixth day because the attending physicians feared toxicity, and she died on the eighth day. Necropsy revealed an acute staphylococcic osteomyelitis of the ilium, with a large abscess and staphylococcic bacteriemia. It seems certain that therapy prolonged the life of this patient, but it is, of course, impossible to say whether she would have survived if therapy had been given continuously. Two cases of staphylococcic bacteriemia in children were also treated with sulfamethylthiazole before the data on its tendency to produce polyneuritis were available. Both of these patients recovered.

One patient with staphylococcic empyema, first seen with a temperature of 104° F., gave prompt response to sulfathiazole alone. The sulfathiazole was continued for one week after the temperature was normal and cultures were negative with no evidence of reaccumulation of fluid. The patient remained afebrile for thirty-five days and then had a recurrence of fever and fluid accumulation from which a nonhemolytic *Staphylococcus albus* was again cultured. Sulfathiazole was given for six weeks, with adequate blood levels, but the fever did not disappear nor did the cultures become negative until after sulfathiazole in suspension in normal saline had been injected into the pleural cavity on two occasions. The patient had an eosinophilia during the first course of sulfathiazole therapy, and during the second course he developed an arthralgia which disappeared after the administration of the drug was discontinued. This illustrates the importance of continuing the administration of the drug for a long period of time after the temperature is normal and cultures are negative and also shows that it is difficult to sterilize large collections of pus with these agents unless the pus is drained and the drug is applied locally.

Three other patients with localized staphylococcic cellulitis progressing to abscess formation recovered with sulfathiazole therapy after drainage had been established. Two of these also received neoarsphenamine. One patient with staphylococcic infection of the urinary tract made a prompt recovery on sulfathiazole alone.

This very limited clinical experience with the drugs leads me to believe that it is important to start therapy at the earliest possible moment, to maintain blood levels continuously without any intermission, to drain localized accumulations of pus and to introduce sulfathiazole in suspension locally as suggested by Spink and Hansen,[7] and to continue therapy for at least one week after all evidence of infection has disappeared. It is also important to observe patients carefully for a period of time after discontinuance of therapy.

SUMMARY

In cultures of living human marrow infected with hemolytic or nonhemolytic *Staphylococcus aureus*, neoarsphenamine and sulfathiazole

have proved superior to sulfanilamide and sulfapyridine. Sulfamethylthiazole is effective, but because of its toxicity, it should not be used clinically.

The most desirable concentration of neoarsphenamine is 1:150,000; this corresponds to about 130 gamma of arsenic per 100 c.c. One-half of this concentration is ineffective, and twice this concentration over a period of time kills the marrow cells.

The optimal concentration of sulfathiazole is from 5 to 10 mg. per 100 c.c., with relatively little difference in effectiveness in the lower and higher concentrations.

In some experiments neoarsphenamine was definitely superior to sulfathiazole. In other experiments the reverse was true. The combination of the two drugs was often more effective than either alone and was always more effective than the less effective of the two used.

Neither drug led to complete sterility of the cultures in as high a percentage of the cases as did sulfanilamide against the beta hemolytic streptococcus when similarly tested.

The larger the inoculation of organisms, the less effective were the drugs.

A tentative dosage plan to attain the proper blood levels of these drugs clinically is outlined.

In a limited number of cases of serious staphylococcic infections, neoarsphenamine alone and sulfathiazole alone or the two in combination have demonstrated definite therapeutic value.

Suggestions are made as to the therapy of various types of staphylococcic infection, but much further work must be done before final conclusions are justified.

The data available suggest that each drug will have a place in the therapy of staphylococcic infections and that the combination of the two may prove more effective than either alone in the most serious of these infections.

I am indebted to the Department of Medical Research of the Winthrop Chemical Co., Inc., for the neoarsphenamine, and to the Squibb Institute for Medical Research for the sulfathiazole used.

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NEUROMUSCULAR DEVELOPMENT OF THE HUMAN INFANT AS EXEMPLIFIED IN THE ACHIEVEMENT OF ERECT LOCOMOTION

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NEW YORK, N. Y.

THE SIGHT of a baby taking his first step is one which has excited both admiring and inquiring minds for ages. Peculiarities of individual gaits have figured among the diagnostic symptoms of disease in the central nervous system; the sheer mechanics of walking has intrigued the physicists, the anatomists, and even the engineers. Embryologists and neuroembryologists have become aroused over the successive changes in neuromuscular movements which develop into characteristic progression of lower vertebrates. Psychologists have been concerned over the innate and learned qualities of erect locomotion as it develops in children; and recently considerable significance has been attached to the chronological age at which the ability is individually achieved. There have been only a few studies which purport to have analyzed in the infant the changes in neuromuscular activities which culminate in a mature, integrated gait.

Obviously the behavior is complex; the details transcend satisfactory analysis. It has been demonstrated in other studies[1, 2, 3] that the delineation of changes in overt behavior provides a basis for interpreting gross reorganization of the central nervous system. The method involved in delineating successive phases of a selected neuromuscular activity calls for some arbitrary limitation of boundaries within which changes in motor activity might be observed.[4] It is well recognized that most infants achieve a sitting posture before they creep, creep before they walk, and walk before they independently assume the erect posture. But the chronological listing of achievements in this manner does not reveal the progressive changes in neuromuscular activities which consummate in a given function. It is also well recognized that at the inception of independent walking the toddler steps with a wide base, displays hyperflexion at the two major foci, the hips and the knees, shows little flexion at the ankle joint as indicated by the contact of the sole with the underlying surface, holds the arms in extension and abduction, and moves in a staccato or isolated manner. Within a few months striking changes have taken place. The child steps in rhythmical heel-toe progression; the base is no longer excessively wide; the arms swing in associated movements; and the movements of different parts of the body function smoothly

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Calculations of the data were made by R. V. Campbell and R. S. Childs. Illustrations were drawn by K. W. Breeze.

for the integration of an efficient gait. Such changes in the mode of progression obviously reflect maturational changes in the central nervous system. However, the first steps of the infant mark not the inception but merely a milestone in a long and continuous process of development which has been going on from the beginning of life; in a broader scope, from the beginning of man. It goes without argument that the assumption of an erect posture and erect locomotion are among the chief characteristics which differentiate the human from the subhuman species. While a study of the development of erect locomotion during ontogeny cannot portray its phylogenetic evolvement, the appraisal of ontogenetic development of this behavior must take into account its phyletic origin. An ontogenetic analysis requires the determination of some convenient point of departure from which progressive changes may be pursued.

There are two outstanding features of erect locomotion which are of aid in determining the framework within which observations of developmental change may be made. In order to walk independently, it is necessary (a) to maintain balance in an erect position and (b) to propel the body forward by alternate movements of the lower extremities. However, by the time these two features become coordinated to the extent that an independent step is possible, considerable development both in the equilibratory and propulsive mechanisms has occurred. In order therefore to analyze the preceding phases of neuromuscular development, it seemed desirable to support the infant in an erect position so as to observe any manifestation of propulsive movement prior to the onset of equilibratory control. Within this framework it was possible to observe developmental changes in postural adjustments and propulsive movements from the newborn period until a well-integrated gait became established. A total of 3,387 observations were made upon 82 children, ranging in age from birth to 8 years. Of this total 2,120 were recorded on motion picture film, and 1,267 were written protocols. A total of 20,250 feet of 16 mm. film was exposed in making these cinema records. Observations of each child of the group were made at weekly or less frequent intervals, depending upon the age of the child at the time of observation. The number of observations on each child varied from one to 165. In addition to the group data thus collected, longitudinal data on five different infants were obtained by daily observations during the first eighteen months to two and one-half years. Two of the children upon whom intensive observations were made were identical twin boys, and three were unrelated girls.

Examination of this mass of records revealed characteristic developmental changes in the details of postures and movements as the child passed through infancy into early childhood. For example, base width varies from the status of the newborn feet practically in juxtaposition, to the excessively wide base of the toddler, and back to the characteristically normal base of the run-about child. Similarly the arms of the

newborn infant are usually held in flexion and adduction; those of the toddler are extended and abducted, while the arms of the older child swing in rhythmical, associated movements. However, to analyze the progressive changes manifested in each detail seemed unwieldy. A more practical method was to consider a constellation of such details which commonly are more or less associated and to appraise the state of development of the behavior at the time of each recording in terms of these mass features. On this basis it was possible to select seven fairly well-defined phases through which any child passes as he advances from the newborn state to the acquisition of a characteristically human gait. There are, of course, individual variations, but in evaluating the records attention was focused upon those features common to the development of the behavior pattern without specific regard for individual peculiarities. Since appraisals of each observation were made in terms of the criteria used in defining the seven phases, a plus rating was assigned to the phase most representative of the behavior as recorded at the time of observation. Such ratings provide a symbolic system whereby the accumulation of descriptive data can be more readily manipulated intellectually. Although an interpretative rationale figured in the criteria used in making the ratings, it was a product of long experience in observing the behavior and did not play a part in the original observations which were limited to descriptions of directly observable phenomena. The rationale refers to gross interpretation of the levels of neural organization involved in the identification of each phase of the activity. The procedure adopted in appraising these observations on the development of erect locomotion will be clarified by the following descriptions of the criteria used in defining the successive phases of development.

ANALYSIS OF SEVEN SELECTED PHASES IN THE DEVELOPMENT OF ERECT LOCOMOTION

A. *The Newborn or Reflex Stepping Phase.*—The posture of the newborn infant when held in an upright position is one of general flexion. Usually the neck is flexed so that the chin is brought near the chest; the upper extremities are flexed at the elbow and adducted toward the midline; and there is marked flexion at the two major foci in the lower extremities. The contact of the feet with the underlying surface is undifferentiated; sometimes it is the lateral aspect; sometimes it is digital; and sometimes it is the entire sole. Ordinarily the base is narrow, the feet being in juxtaposition or even crossed. Oftentimes when supported at the axillae, the infant will engage in rhythmical stepping movements. Some of the more hypotonic infants will not rest their weight upon the feet, so that the lower extremities double beneath them; others exhibit considerable tonicity, not only supporting their weight somewhat but stepping a distance of four or five feet along the surface. These stepping

movements are more rhythmical and organized than the so-called "random movements" of the newborn infant. However, to the observer they appear distinctly localized and not in functional relation with the head and upper part of the body. Since no evidence has been obtained in

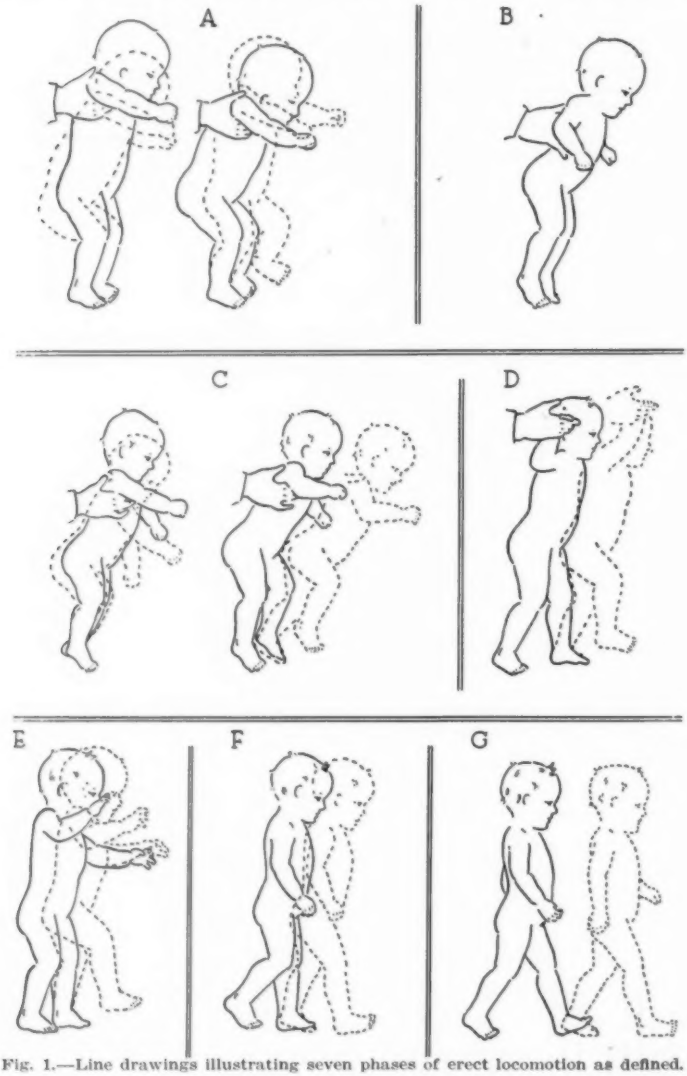

Fig. 1.—Line drawings illustrating seven phases of erect locomotion as defined.

subsequent development to justify a differential interpretation in the adjustment of the infant who exhibits stepping movements in contrast to the more flaccid type, both types of reaction have been given a plus

rating in Phase A in the appraisal of these data. The general postural adjustments of the newborn infant are illustrated by the line drawings *A* in Fig. 1.

B. *The Inhibitory or Static Phase.*—Within a few months it will be observed that definite changes in postural adjustment have taken place. The child begins to hold the head more steadily in line with the body plane, or even extended. There is less flexion in the upper extremities; the shoulders are held in a plane forward to the pelvic girdle; there is less flexion in the lower extremities; and the contact of the feet with the underlying surface is commonly digitalgrade. The tendency toward reflex stepping is more or less suppressed or inhibited. This inhibition of reflex stepping becomes more apparent when the baby's shoulders are moved forward or slightly lifted upward. Even under such stimulation his feet will often stay in position as if glued to the floor, or he will drag them behind. Obviously development has gone forward, and it has taken place more aggressively in the superior than it has in the inferior regions of the body. Line drawing *B* of Fig. 1 is illustrative of this phase of development. It is a period characterized by development of equilibratory control of the head with respect to the shoulder girdle and by a diminution of the early posture and reflex stepping of the newborn infant.

C. *The Transition Phase.*—For the sake of a better name this period has been called the transition phase since the general adjustment of the head with respect to other parts of the body is essentially the same as those noted in the second phase, but there has been a definite advancement in the activity of the body. Often the infant will tend to move the body up and down although holding the feet in position; or he stands in position and stomps with first one foot or the other; or he may again participate in stepping movements though the postural adjustment is noticeably different from that of the newborn. It is sometimes difficult to tell whether these movements are of a deliberate or reflex quality. In any event it appears as if those mechanisms which activate movement are being interwoven with those governing antigravity and static postural control. Phase C is illustrated by the line drawings of Fig. 1 as designated.

D. *The Deliberate Stepping Phase.*—Gradually the child's stepping and his postural adjustment become more evidently deliberate. There has been obvious progress in the maintenance of an erect posture. The shoulder girdle is held more in line with the pelvic girdle. Changes in quality of stepping and the interrelationship between posture and movements are well brought out by the fact that the stepping can be provoked more readily if the infant is held by the hand, than when he is supported under the arms. This mode of support calls upon him to exercise his newly acquired power of postural control. Frequently the child will be observed looking at his feet as he steps, an act which also reflects the

deliberate quality of the movements. Not only the quality of the somatic activity but the facial expression, the glint in his eye, etc., reflect that a higher level of neural organization is operating in the function. Toward the end of this period it may often be difficult to induce the child to stand on his feet. He will do so when he pulls himself up by the crib, but, when it is imposed upon him, he may deliberately flex the lower extremities on the abdomen so that he is suspended or try to lower himself to a sitting position. Such behavior, however, forebodes increasing advancement of voluntary control over his neuromuscular activities. Line drawing *D* of Fig. 1 represents this stage of development.

E. *The Independent Stepping Phase.*—In the next phase the development of equilibratory control and the mechanisms governing propulsion have become sufficiently coordinated to enable the child to engage in independent walking. At this time he holds the upper extremities in extension and abduction; even the fingers are extended; the base is wide; there is marked flexion at the knees and hips; as he steps forward he lifts the legs high; and the movements are staccato and isolated. At the onset of independent locomotion some infants compensate for a lag in equilibratory development by taking a few quick running steps before toppling; others in whom the balancing mechanism appears to be advanced beyond the propulsive mechanisms take slow steps with noticeably long pauses between each movement of the foot forward. The movements of such young toddlers are staccato or isolated, and often the child is observed to swing the entire lateral aspect of his trunk forward as he steps. In other words, at the onset of independent locomotion the stepping movements are not individuated from the total body movements. Often the child picks his foot up and puts it down almost as if it were an object foreign to his own body. The use of the toes in gripping the surface is also an expression of an immature balancing system. Contact with the surface is usually plantigrade except in the case of children who begin with rapid running steps; then frequently the contact with the surface is digital. When the child took only two or three steps before falling and had to be supported by the hand to traverse a distance of several feet, he has been given a plus rating in both Phases D and E. The inception of independent walking is illustrated in the line drawings *E* of Fig. 1. After the onset of walking the development is rapid for a period of weeks. Gains are evinced not only by the distance traversed but in equilibrium and general mode of stepping. Gradually there is a reduction in the degree of extension and abduction of the upper extremities until finally the arms are held by the body to the elbow level, the forearms being extended in front of the body. There is also a diminution in base width and a gradual decrease in the flexion of the lower extremities at the hips and the knees. Reduction in the excessive or exaggerated movements becomes more and more marked until finally the change in mode of locomotion justifies ratings in a more advanced phase.

F. *Heel-Toe Progression.*—With advancing coordination of movements it is observed that the child begins to walk in heel-toe progression; the heel of the forward foot strikes the surface as the back foot is raised on the toes. The length of the step and the time interval between movements become more consistent. The arms are held by the sides of the body; the fingers are more relaxed than extended; and the base is of normal width. The lower extremities are not lifted so high in the move forward, and flexion of the ankle joint is definitely indicated. This phase is illustrated in Fig. 1 by the line drawing *F*. Just at the onset of this phase the child may step from toe-to-heel, a characteristic which reflects a transition from the whole-sole to the heel-toe point of contact. Accordingly, behavior on such occasions has been rated plus in both Phases E and F. Toward the end of this period it is noted that a forearm occasionally moves somewhat synchronously with the forward move of the opposite lower extremity. Such instances have received plus ratings both in Phase F and Phase G.

G. *The Integrated or Mature Phase of Erect Locomotion.*—The identifying feature of the mature phase is the synchronous swinging of the arms in associated movements with the opposite lower extremity. This phase is illustrated by the line drawing *G* of Fig 1. In the beginning it is essentially the forearms which move synchronously with the opposite lower extremity, and the arm movements are not entirely regular. Successive arm movements do not cover the same distance or repeat the arc. Advancement during this phase is expressed by regular and rhythmical swinging of the arms from the shoulder level. It is not a characteristic which is overtly present at all times, even in the gait of the adult, but its development and functioning denote the integration of the locomotor mechanisms. Naturally changes in gait, especially in individual details, continue throughout the life span, but by the time associated movements, i.e., rhythmical swinging of the arms, are well developed the essential features of the behavior activity are established.

ANALYSIS OF THE DATA

The 3,387 observations having been rated according to the criteria outlined above, it was possible to determine the percentage of occurrence of each phase within any chronological age period. The data were computed in terms of twenty-day intervals, and the number of observations for each age period is shown in Table I.

The distribution of each phase according to chronological periods is shown in the curves of Fig. 2. Similar curves (Figs. 3 and 4), representing longitudinal data on the five individual children, indicate the percentage of observations during any age interval when each phase was manifested. Except in one instance these children were too young at the time the study was terminated to have achieved complete stabilization in the mature phase. Nevertheless, the trend is indicated. From

TABLE I

NUMBER OF OBSERVATIONS PER 20-DAY AGE INTERVAL

AGE IN DAYS (MIDPOINT OF INTERVAL)	NO. OF OBSERVATIONS	AGE IN DAYS (MIDPOINT OF INTERVAL)	NO. OF OBSERVATIONS
10	138	810	23
30	86	830	27
50	84	850	20
70	90	870	32
90	86	890	27
110	89	910	24
130	79	930	19
150	69	950	19
170	69	970	18
190	72	990	26
210	57	1010	22
230	68	1030	19
250	71	1050	13
270	80	1070	19
290	68	1090	15
310	70	1110	13
330	77	1130	11
350	76	1150	13
370	73	1170	8
390	84	1190	5
410	83	1210	11
430	79	1230	11
450	84	1250	13
470	73	1270	8
490	55	1290	12
510	66	1310	12
530	68	1330	7
550	62	1350	11
570	59	1370	6
590	65	1390	6
610	43	1410	8
630	48	1430	7
650	54	1450	8
670	42	1470	5
690	45	1490	5
710	36	1510	6
730	35	1530	3
750	41	1550	4
770	30	1570	2
790	43	1590	5

the group curves it is evident that the mature phase is not usually established until the child is past 3 years of age although in many children its emergence is manifested before the end of the second year.

Although the number of repeated observations upon the same child varied from 2 to 164, there were sufficient repeated observations on approximately 46 subjects to determine the age of onset and disappearance of each successive phase. The distribution curves in Fig. 5 show the percentage of children at each age interval manifesting (a) the appearance and (b) the disappearance, of each phase. "Appearance" in this instance refers to the first plus rating assigned to a phase, and "disappearance" refers to the last plus rating made on any phase. The ogives in Fig. 5 marked "appearance" indicate the total percentage of children at any age in whom the particular phase has already made its

appearance; those marked "disappearance" indicate the total percentage of children at any age in whom the particular phase is no longer manifest. The difference between the two curves gives the total percentage of children in the phase. The heavy vertical lines through the dotted areas signify the chronological age when the greatest number of children exhibited each phase. For example, at 425 days, 77 per cent were rated plus in Phase E, or the beginning stage of independent walking.

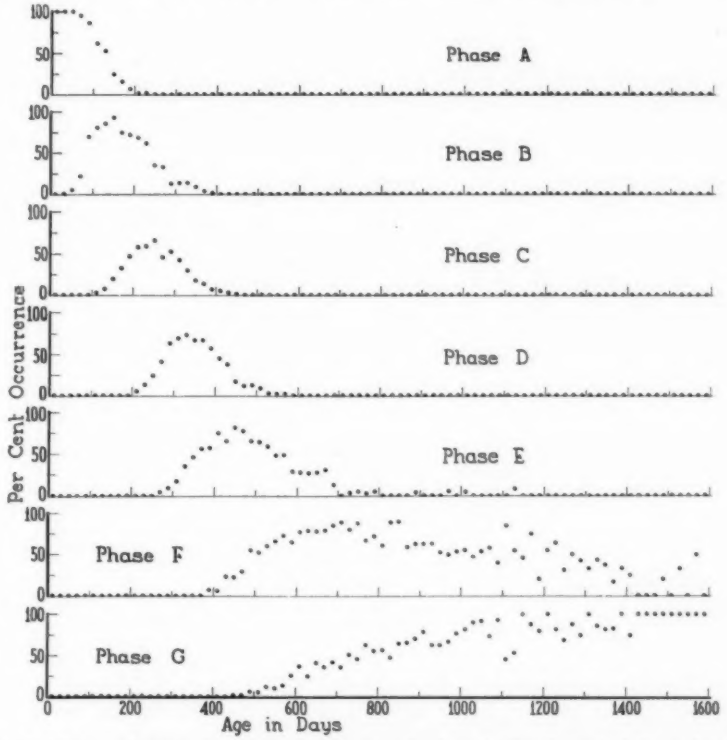

Fig. 2.—Curves showing the age period when each phase is the characteristic mode of behavior as represented by the group data.

When the modal ages for the group showing the emergence and disappearance of each phase are plotted against chronological age, the data in both instances fall approximately along a straight line, as demonstrated by the group data in Fig. 6. These plots represent to some extent the adequacy of the criteria employed in differentiating the phases of development, but in so far as the criteria are adequate, they reflect the rate of development in this particular activity. That is, assuming the phases to be distributed in a linear fashion, we may express the rate of development of the activity in terms of the number of days per phase. The slope of the data represents a constant increase or the rate of de-

velopment per unit of time. The rate of development as manifested by the individual children was obtained by plotting the onset and disappearance of each phase against chronological age. In these five cases the data also fall approximately along a straight line, as is evident from the individual curves in Fig. 6. Aside from experimental error, variations in these slopes reflect individual differences in rates of growth. When different types of behavior development can be expressed in terms of *rates,* a means is provided whereby growth of different types of phenomena as well as different individuals may be compared.

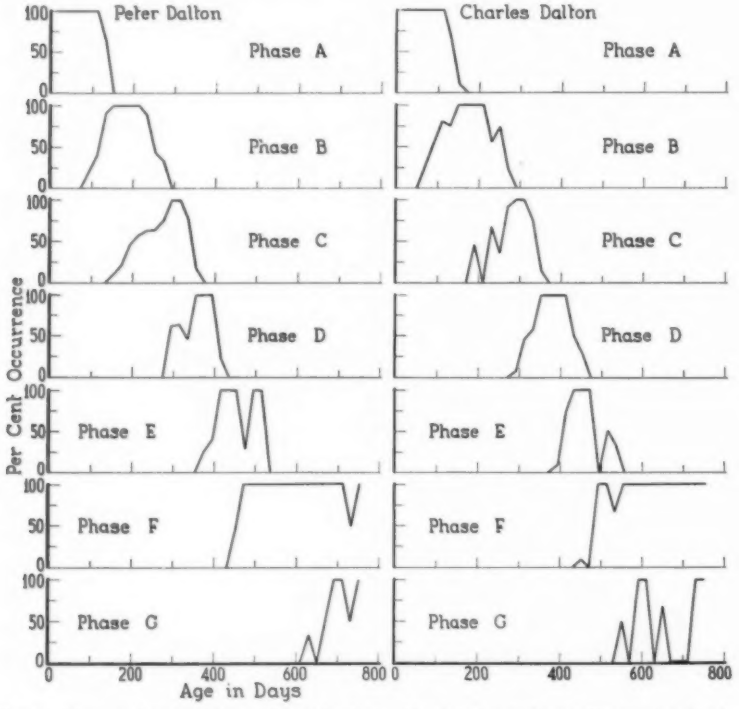

Fig. 3.—Curves showing the age period when each phase was the predominant behavior pattern as manifested by identical twin boys.

INTERPRETATIVE ANALYSIS OF PHASES

As was stated above, the phases selected in the development of this activity were those which seemed to reflect reorganization of the centers and pathways of the nervous system involved in activating and controlling the neuromuscular adjustments. Identification of changes in overt behavior with specific reorganization of neural centers is as yet unattainable. However, from the structural studies of the fetal and newborn brains as advanced by Tilney,[5] Conel,[6] and de Crinis[7] certain fundamental assumptions concerning the development of the newborn

brain appear to be justified, and, as such, they provide a reference base for the analysis of more advanced stages of behavior development. Evidence cited in each of these studies renders the active functioning of the human cortex at the time of birth highly problematical. It is reasonable, therefore, to assume that the activities of the newborn infant are controlled at an infracortical level. At the outset, then, there are two

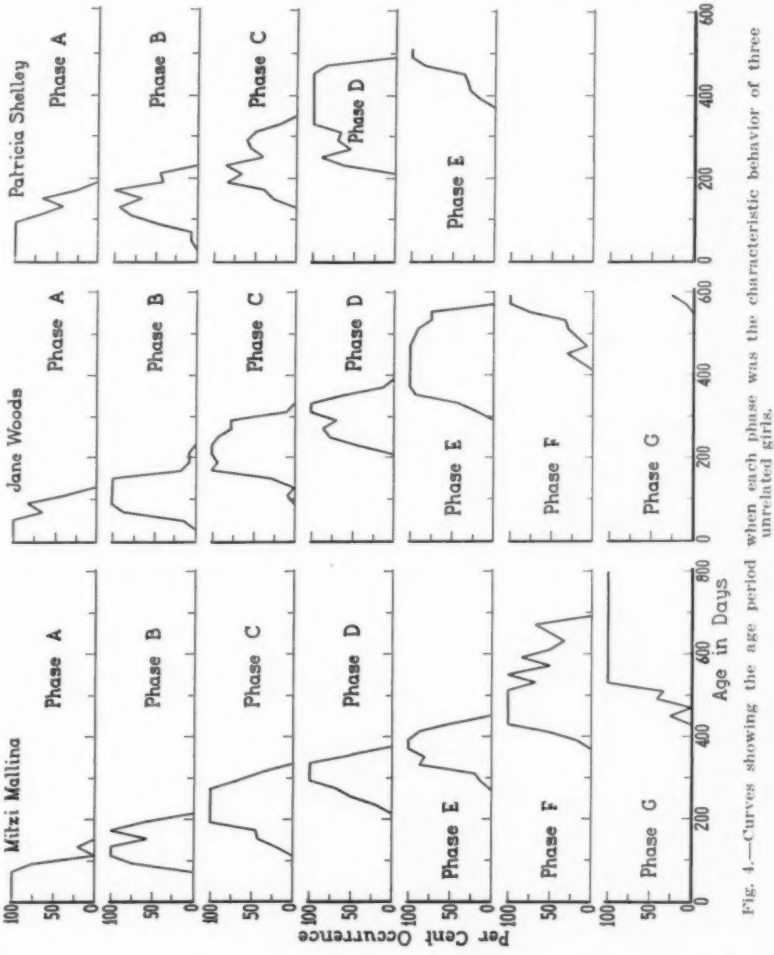

Fig. 4.—Curves showing the age period when each phase was the characteristic behavior of three unrelated girls.

major divisions of the central nervous system to be considered in the appraisal of overt behavior changes, viz., (a) the infracortical or nuclear division and (b) the cortical division. Structurally the nuclear regions are recognized by the way in which the cells are clustered together without definite plan or orderly arrangement, and functionally behavior

controlled at this level exhibits a sudden turnover of impulses without much latency in the period of reaction. Cortical areas are revealed by the orderly arrangement of the cells into six differentiated layers, and

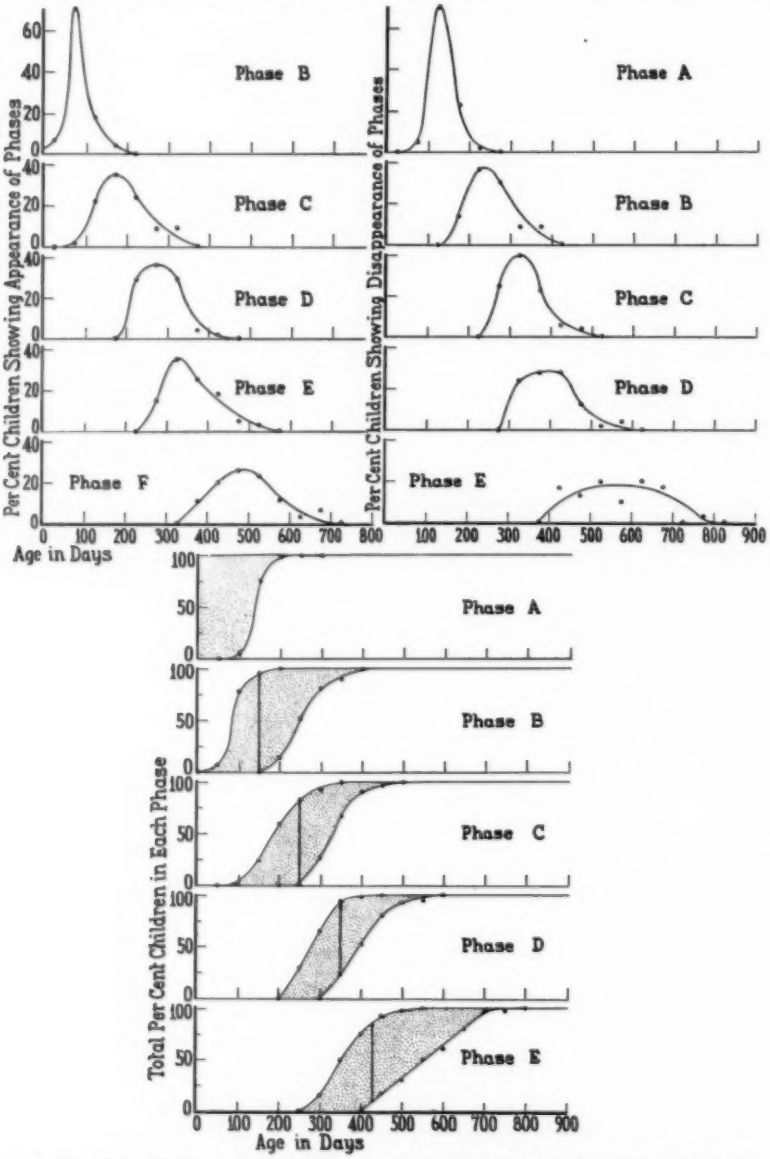

Fig. 5.—Distribution curves showing at any age period the percentage of children in whom the (a) appearance and (b) disappearance of each phase was indicated. The ogives indicate the total percentage of children in whom the appearance and disappearance of each phase had been indicated. The dotted area between the ogives indicates the percentage of children at any age manifesting each phase of development.

cortical behavior discloses a planned element in the mode of reaction, as well as a latency of response, and a fertile variety of responses. It is generally agreed that the cerebral cortex exerts two major functions: (1) an inhibitory influence upon subcortical or nuclear activities and (2) an activating and controlling influence upon neuromuscular functions.

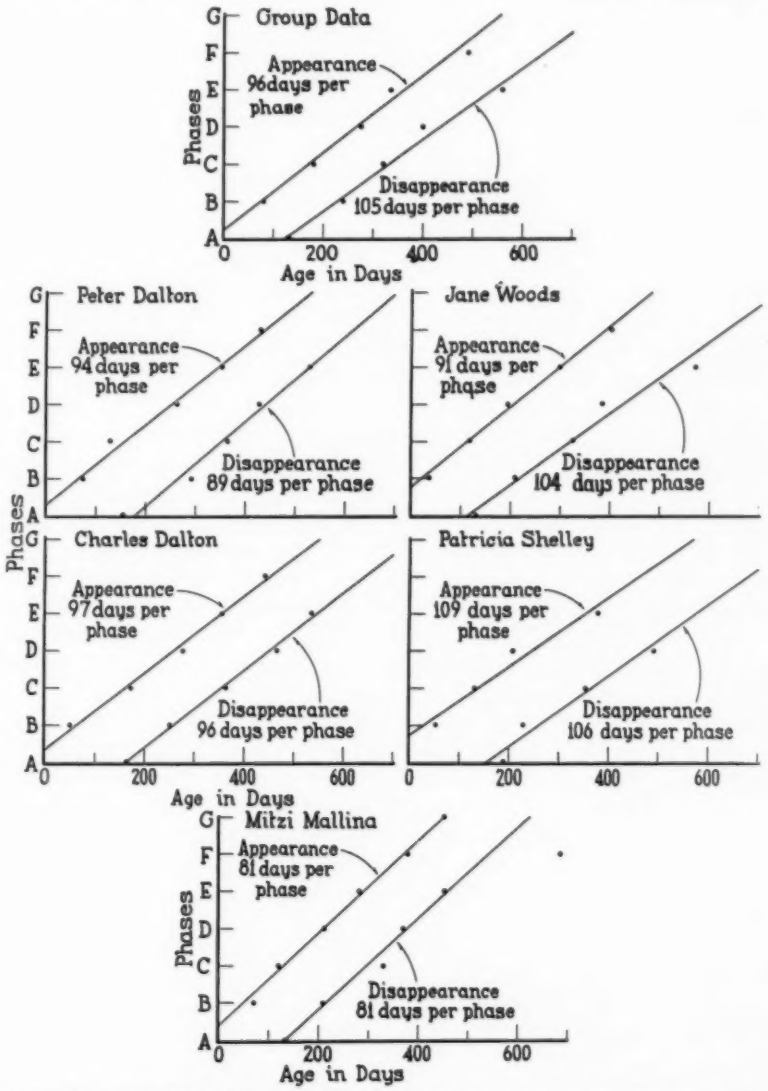

Fig. 6.—The onset and disappearance of each phase, as exhibited by the group and the five individual children, plotted against chronological age. The slopes of the lines indicate the rate of development.

Therefore, significant features in the development of a behavior activity are those which reveal a diminution or suppression of nuclear functions, and qualities which indicate the onset and expansion of cortically controlled activity. Both features denote the advancement of cortical maturation and reorganization of the relationship between cortical and subcortical centers.

In view of the above postulates the postures and movements characteristic of the newborn infant are assumed to be controlled at a nuclear level. While the distribution curve representing this phase of the behavior indicates 100 per cent occurrence during the first few weeks, there are detailed changes in the behavior which are not disclosed by this gross classification. Although both postures and movements at this period are controlled at a nuclear level, it is evident that reflex stepping becomes more demonstrable around the third postnatal week than it is immediately after birth. This observation is corroborated by the investigations of Stirnemann,[8] which showed that the incidence of stepping movements increased 42 per cent during the first two weeks of life. Like the Moro,[9] suspension grasp,[10] and swimming[11] reflexes it seems to reach a peak before active diminution of response sets in. The percentage curves connected with this report do not demonstrate this rise because all adjustments, whether or not they included stepping movements, were given plus ratings since both modes of behavior represent nuclear activity. The type of change in behavior which takes place during the first postnatal weeks seems to indicate further advance in the maturational processes of subcortical centers. Langworthy[12] has pointed out that between birth and the second postnatal month rapid increase in myelinization occurs in the brain stem. This increased medullation of pathways in the brain stem may be a counterpart of improved organization of infracortical functions during the first few weeks of postnatal life.

The onset of cortical inhibitory influences is reflected in the second phase. It is exhibited in overt behavior by a diminution of the reflex stepping movements, a reduction of the general flexion which characterizes the newborn phase, and by an increase in control of postural muscles, particularly in the superior region of the body. Development of the mechanisms controlling posture appear to be advancing at a more rapid rate during this phase than are those activating or governing progressive movements.

In the succeeding phase the gain in postural control becomes interconnected with the centers activating movement. Although maintaining more or less the posture characteristic of the second phase, the child tends to move his body up and down (with feet in position), to stomp, or to engage in stepping movements. The quality of these movements is not distinctly deliberate, an observation which seems to suggest that they are still controlled essentially at a subcortical level.

Phase D denotes the onset of cortical participation although not complete control over progressive movements of the legs. However, cortical control of posture and cortical influence upon progression have not become integrated. The child must still be given some support. As the infant advances through this phase, the amount of aid needed becomes increasingly less.

Finally the development in postural control and in progressive movements becomes interconnected sufficiently to enable the child to make independent walking steps. These connections are only loosely maintained as evidenced by the dyssynergia, excessive or exaggerated movements, and the relatively poor coordination. Some of these excessive movements appear to be compensations for an immature equilibratory system rather than actual aids in movements. Superficially, the extended and abducted position of the arms seems to be for the purpose of facilitating balance during the act of walking. Actually, it seems they are held there merely in readiness to protect the child when he falls. On a few occasions the arms of children in this stage of development have been fastened down parallel to the body; it was found that they could walk just as efficiently with the arms down as extended, but, when they started to fall, they were at a complete loss to know how to manage their bodies. The upper extremities are held extended as a compensation for an undeveloped antigravity mechanism rather than as a balancing element in progression. As coordination advances and falling is less imminent, the arms are no longer held in this exaggerated position.

The two final phases as defined in this study reflect not so much changes in neural levels as refinement of coordination and integration of the movements involved. It is those centers which have to do with the timing and articulation of movements which exhibit the greatest advancement during these later phases. Also those centers which have to do with attention or concentration of effort become somewhat liberated, and the act of walking becomes more automatic, albeit automatic at a different level than the infracortical movements.

Studies of the cytoarchitecture of the cortex reveal that the motor area is the one developing most rapidly during the early months of life. Conel[6] points out that the local cortical region of the upper trunk, shoulder, and arm is the most advanced in development at the time of birth. It is in these regions that the earliest neuromuscular development is observed in behavior. According to de Crinis,[7] the motor area of an 11-month-old infant's brain has attained a relatively advanced stage of development, and it is about this period that most infants exhibit unmistakable signs of incipient cortical participation in the postures and movements involved in erect locomotion.

While this discussion has been limited essentially to the manifestation of voluntary or cortical control of the movements involved in erect locomotion, it is recognized that other organs and centers of the nervous

system, particularly the cerebellum, continue to function in the act of walking and many of the qualities described in this analysis can be attributed to cerebellar development and the maturation of corticocerebellar pathways. As was stated above, this analysis of developmental phases consummating in the maintenance of an erect posture and locomotion does not purport to suggest specific neural correlates; it does, however, provide a behavior basis for further correlation of structure and function when the development of neural mechanisms has been more adequately determined.

THE ASSUMPTION OF AN ERECT POSTURE

The analysis of sequential phases in the development of erect locomotion has been made in an arbitrarily selected framework which placed the body in an erect position. Obviously this is not the order in which development would be detected in ordinary situations. It is well known that most infants achieve the ability to roll from a supine to a prone position before they are able to sit, that they are able to sit before they creep, to creep before they walk, and walk alone before they can independently rise from a supine to an erect position. These are all factors, or milestones, which signify the course of development ultimately leading to the assumption of an erect posture and locomotion. However, neuromuscular development which is continually in progress cannot be revealed by such listing of achievements in an orderly manner. Sometimes it is helpful to place the infant in situations which expose or provoke optimum neuromuscular functioning. Such a method was adopted as a means of studying the gradual development of control over the antigravity muscles which function in the assumption of an erect posture. The method was essentially the same as that previously described in a study of the infant's achievement of a sitting posture.[2] Before the child was able to get up independently, he was pulled, by traction on the upper extremities, from a recumbent to an erect position. Subsequently his mode of behavior was studied as he independently rose from a dorsal to a standing position. Under these circumstances it was possible to distinguish seven significant phases which reflect advancement in neural organization.

ANALYSIS OF SEVEN DEVELOPMENTAL PHASES IN THE ASSUMPTION OF AN ERECT POSTURE

A. *The Passive Phase.*—If, after the newborn infant has been pulled into a sitting angle, an attempt is made to pull him upward, his response is distinctly passive. He holds his lower extremities flexed on the abdomen, and any lifting of the buttocks above the surface is conducted by the adult. This type of reaction has been rated as Phase A and is illustrated in the line drawing of Fig. 7, as designated.

B. *The Extensor-Thrust Phase.*—At the inception of extensor development in the lower extremities, the child shows an incipient urge to push himself upward after he has been pulled into a sitting position. He places his feet on the surface and makes several extensor movements of the lower extremities so that the buttocks are raised by his own efforts slightly above the surface. However, he cannot sustain the extended position and the degree of extension is definitely limited. This phase of development is illustrated in the line drawing *B*, Fig. 7.

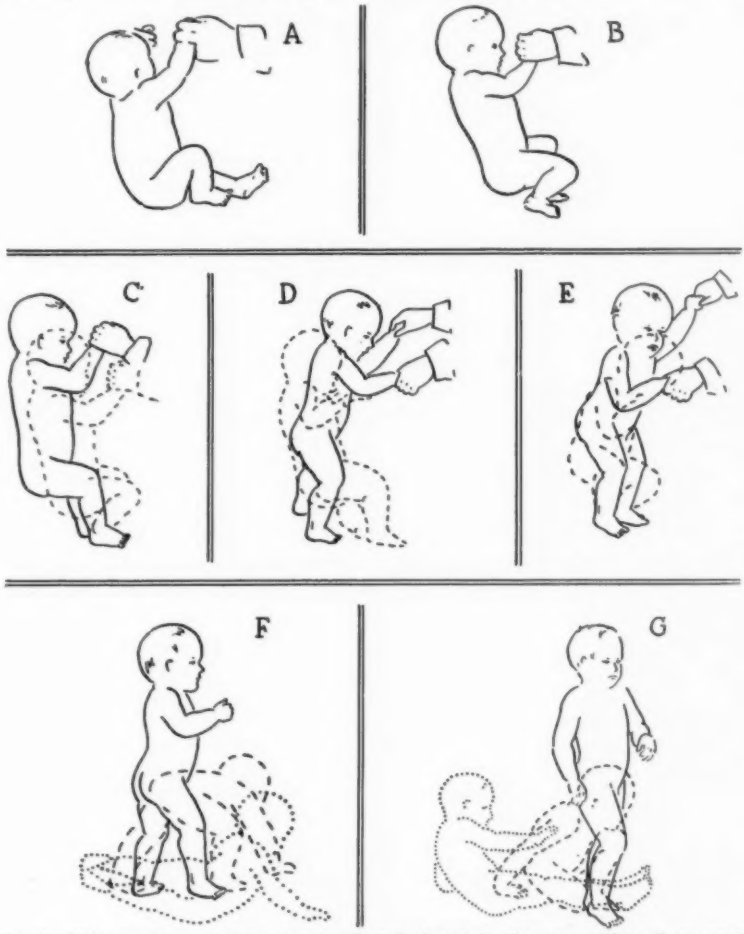

Fig. 7.—Line drawings showing seven selected phases in the assumption of an erect posture.

C. *The Orthotonic Phase.*—As the development of extensor muscles advances, the infant places the feet on the underlying surface, extends the lower extremities, and attains a somewhat erect position. However,

the shoulder girdle is usually in a plane posterior to the position of the feet, and the baby is unable to pull himself completely vertical. Phases B and C represent advancement in extensor capacity, and the differentiation between them is essentially a question of degree.

D. *The Vertical Posture Phase.*—In the succeeding phase, after the child has pushed himself into the leaning position, as characterized by Phase C, he then gains an erect position, i.e., brings the shoulder girdle over the pelvic girdle. The vertical position is accomplished either by swaying his shoulders from side to side and a little forward with each sway or by stepping back with first one foot and then the other until the feet are brought in line with the shoulders. These movements are, however, isolated or staccato, and it is only with effort that the child actually achieves the vertical position. This phase is illustrated by the line drawing *D*, Fig. 7. In all of these positions where the experimenter gave aid, care was exercised so that the aid given was essentially in the nature of support, and the child was allowed to exercise his own neuromuscular control in the movements involved.

E. *The Vertical-Push Phase.*—Subsequently the ability to push his body upward and to get the shoulder girdle in line with the pelvic girdle becomes better coordinated. Almost simultaneously as the body is brought toward the sitting angle, the child places his feet on the surface, brings his shoulders forward, and quickly pushes upward. Although he cannot gain the erect position independently at this stage, he is usually able to pull himself up if he has some means of support, such as the bars of the crib. The mode of behavior reflects better control over movements of the lower extremities. This period appears to mark the onset of cortical participation in the movement of the legs engaged in pushing to an erect position. That he is approaching the period of independent action is evident by a slight tendency to turn sideways as he is raised from the dorsal to the sitting position. This tendency to turn reflects an incipient urge to roll into a prone position preparatory to sitting. Advancement in antigravity control is also disclosed by the infant's ability to lower himself from a standing to a squatting position. In the earlier stages he would fall over, if support were withdrawn, without flexing the legs appreciably. That is, he would fall almost as an inanimate body, whereas at this period he can raise his body from the squatting to the erect and lower it from the erect to the squatting provided he is given the slightest support. The ability to lower the body oftentimes lags behind the development of an ability to pull upward. During such periods the child frequently pulls himself up by the crib and then cries lustily because he is unable to let himself down.[13]

F. *The Independent Rising Phase.*—The development of an ability to rise from the recumbent to a standing position independently is antedated usually by the achievement of two other related motor activities: (a) the ability to roll from a supine to a prone position and (b) the

ability to assume a sitting position. The mode of behavior exhibited by most children, as the ability to rise independently from a recumbent to an erect position is attained, consists of the following movements: First the child rolls from a supine to a prone position; then he pushes up on his hands so that the chest is lifted. As he raises the chest, he places first one foot and then the other on the surface so that they are in a quadrupedal position. From this quadrupedal position the trunk is raised upward. At the onset of this phase, the pelvic girdle serves almost as a pivot with the lower extremities maintaining stance, while the trunk is lifted from the quadrupedal to the erect posture. Within a short time, however, it is observed that the lower extremities flex at the knees and the pelvic girdle is drawn backward as soon as the trunk lifting is initiated.

Gradually excessive and poorly coordinated movements are eliminated, and the child no longer rolls completely prone before assuming the quadrupedal position. The movements involved become smooth and better coordinated though they are still sufficiently isolated or staccato in quality to be detected as distinct or separate movements in the activity. All of these changes have been classified under Phase F, as illustrated in Fig. 7 by the line drawing so designated. Finally the child does not roll prone, but, pushing with his arms against the surface, gains the sitting position. From the sitting position he carries his shoulders forward to gain a quadrupedal position, and thence to the erect posture. This type of behavior has been given a plus rating in both Phases F and G since it represents a transition from the circuitous to the integrated method of rising.

G. *The Integrated Phase.*—The mature or integrated phase of development is characterized particularly by the articulation and smoothness of movements involved in rising from a recumbent to an erect posture. Usually the act is initiated by the child's pushing on one arm from the dorsal toward the sitting position. As he approaches the sitting angle, he flexes the lower extremities in order to place the feet on the surface, and as he pushes with the supporting hand, he extends the knees and lifts his body upward. These complex movements are performed so quickly and effectively that they appear almost as one. This phase is illustrated by line drawing *G* of Fig. 7.

APPRAISAL OF THE DATA

The curves in Fig. 8 show the age period when each phase, as described, is the most characteristic mode of behavior as manifested by the group of children observed. The total number of observations was only 1,777, covering an age range of the first five years. Because of the sparseness of the data, an interval of 100 days was used in determining these percentage curves. The average number of observations in each interval was 39, but they varied from 5 to 88. Although intensive analy-

sis of the data was therefore unwarranted, these percentage curves demonstrate the general trend of development in this activity. Curves showing the development of four individual children are presented in Figs. 9 and 10.*

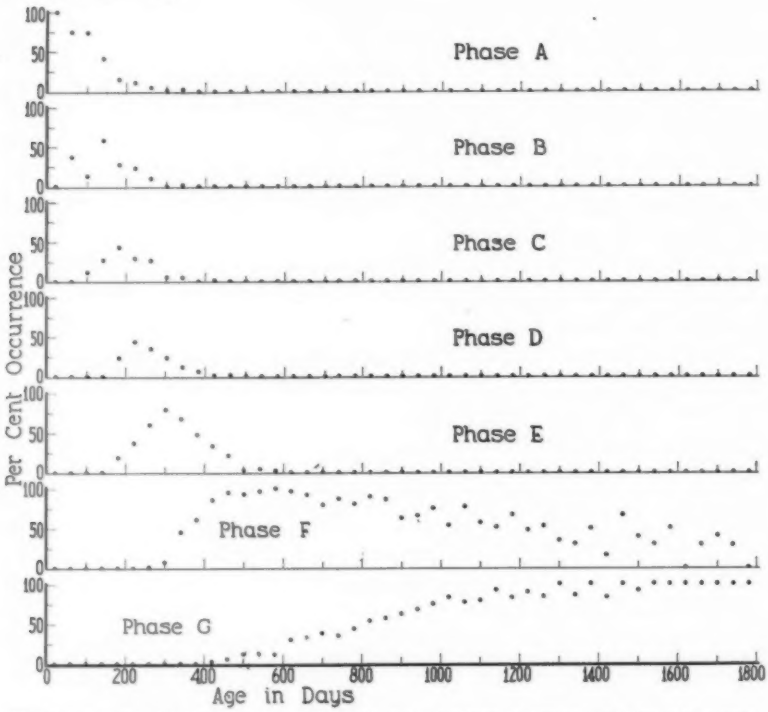

Fig. 8.—Curves showing the age period when each phase in the assumption of an erect posture is the characteristic mode of behavior as manifested by the group.

The first four phases of erect locomotion and the first five phases in the assumption of an erect posture as defined indicate that neuromuscular control proceeds in a cephalocaudal direction. It will be observed from the curves that the onset of Phase D in the analysis of erect locomotion and the inception of Phase E in the assumption of an erect posture occur at about the same chronological period. Both phases reflect advancement in neuromuscular control; they denote the inception of cortical participation in movements of the lower extremities. Advanced neural maturation, that is, integration of the various centers involved, is reflected in the achievement of the mature type of performance in the act of rising. It is possible, however, that changes in anatomical dimensions—the ratio between leg length and body length—are also contributing factors to the changes in method as represented by Phases F and G.

*Daily observations were not begun on the Dalton twins until they were 100 days old, and all of the children were too young to have become stabilized in the final phase of this activity at the time of this reporting.

The progressive integration of centers controlling the assumption of an erect posture with other neural centers is reflected by the conditions which seem to motivate the infant's behavior. At the inception of the ability to rise independently, mere exercise of the newly acquired function appears to be the dominating motive. If, after he has arisen, his

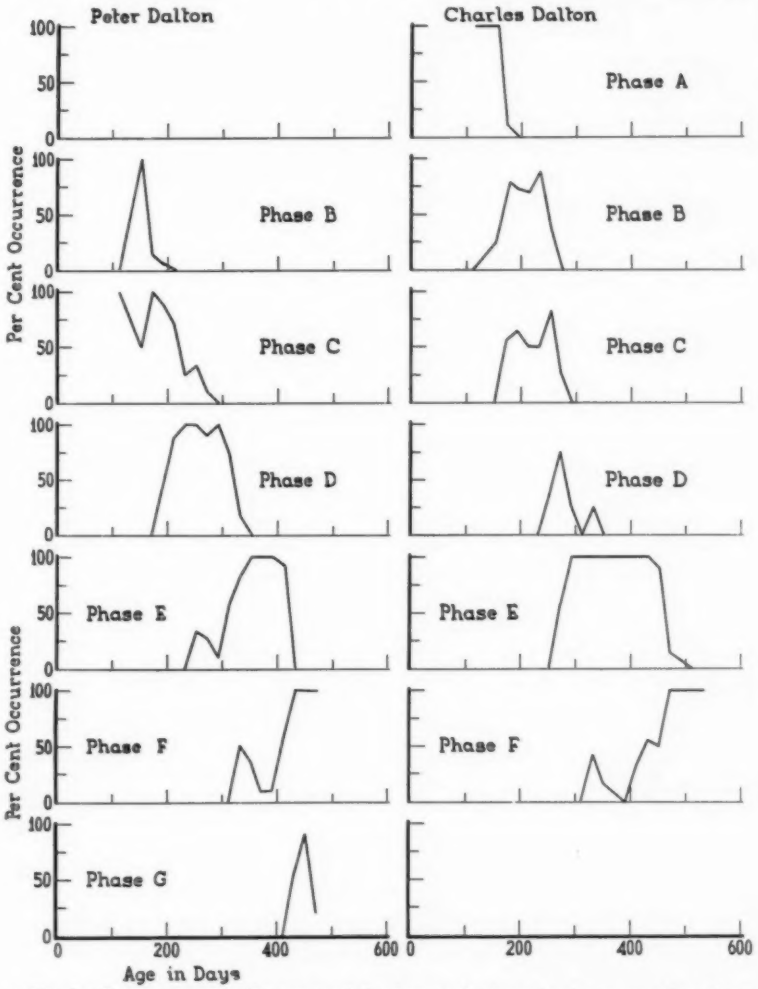

Fig. 9.—Curves showing the age period when each phase in the assumption of an erect posture was the predominant mode of behavior as manifested by identical twin boys.

attention is drawn to a lure some yards away, he will return to creeping as a preferred method of purposive progression. As the erect posture gains dominance, the child will get up to walk for the lure even if it is

only a few feet away and his attention is drawn to it while he is in a sitting or creeping position. Finally the child exercises judgment, selecting the simplest method of progression in accordance with the distance to be traversed and his position at the moment of stimulation.

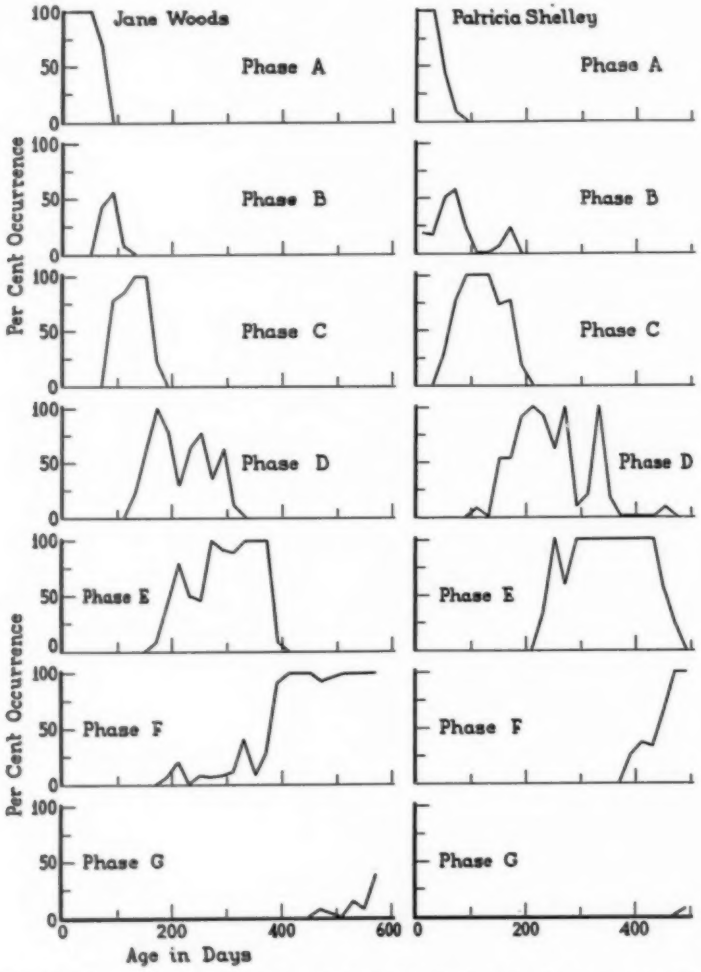

Fig. 10.—Curves showing the age period when each phase in the assumption of an erect posture was the characteristic mode of behavior as exhibited by two unrelated girls.

Increasing development of antigravity mechanisms and also the effect of alteration in anatomical dimensions are exposed by developmental changes in modes of squatting. By the time the child is able to sustain balance independently and before he can rise from a recumbent or

sitting position to an erect posture, he is able to squat and also rise from the squatting position. The squatting posture characteristic of this period is a striking one. The soles of the feet remain flat on the surface; the lower extremities are hyperflexed at the two major flexion foci; and the knees are drawn toward the chest. This mode of squatting continues as characteristic behavior for a long period of time, in fact, until the child is between 3 and 4 years of age, and may be observed as late as 5 years or more. However, the toddlers squat in this manner during long intervals without manifesting fatigue. In groups of children over the age of 3 years or more it is observed that they have a tendency to sit rather than squat when they are engaged in ground play, and if they squat in this flatfoot manner, it is for brief moments only. Children around 5 or 6 years of age begin to show a tendency to lift the heels above the surface as they squat or to squat with the sole of one foot and the dorsiflexed toes of the other foot resting on the surface. It has been suggested that this early phase of squatting may be a residual of a more primitive resting posture, but it may be that the primary factors contributing to modification of the squatting behavior are merely alterations in physical dimensions. In any event, these alterations in anatomical dimensions impose a new problem upon the equilibratory and postural mechanisms of the central nervous system. Not only neural maturation but anatomical and other components are factors contributing to the form and mode of neuromuscular behavior at any given time.

It has been demonstrated in this analysis of erect locomotion and the assumption of an erect posture, as well as in studies of other neuromotor activities, that greater variability is evident in the advanced or voluntary stages of development than obtained in the early, particularly the nuclear, phases of the activity. From current knowledge of the nature of neural functioning this increasing variability should be expected. Indeed, variation in manner of behavior may, within limits, be considered as an indication of advanced stages of development.

SUMMARY

The purpose of this study has been to demonstrate successive changes in neuromuscular activities which culminate in the development of a mature, integrated, human gait. A total of 3,387 observations were made upon a group of 82 infants ranging in age from birth to 5 years. On the basis of these observations it was possible to select criteria which differentiated seven fairly distinct phases in the development of erect locomotion. Once the criteria were defined, it was possible to rate the accumulated observations in accordance with the phase representative of the mode of behavior described. These ratings reduced the data to a symbolic system so that curves showing the trend and duration of each phase could be obtained. Similar curves were presented showing the development of erect progression as manifested by five individual children, two

of whom were identical twin boys. In addition, calculations were made which indicate the rate of development in this activity as represented by the group and the individuals.

In determining the criteria of each phase, it was recognized that certain changes in overt behavior reflect reorganization of the neural centers involved in the activity. On the basis of cytologic studies cited, the analysis embarked with the basic assumption that behavior characteristic of the newborn infant is controlled at a nuclear or subcortical level. Further analysis concerned those qualities of overt behavior which reflected (a) an inhibitory influence from the cortex upon the functioning of infracortical centers, (b) the onset of cortical participation in activating or conducting a particular aspect of the behavior pattern, and (c) the expansion and integration of various cortically controlled movements which are essential to an integrated bipedal gait.

Similarly analyses were made of the changing configurations in neuromuscular movements which lead to the assumption of an erect posture. Criteria were proposed for the differentiation of seven significant phases. Because of the relative sparseness of the observations on this activity the data were not given the critical analysis as were those concerning the development of erect locomotion. However, the general trend of development is indicated, and the qualities of overt behavior which reflect neural reorganization are described. It was pointed out that changes in anatomical dimensions, as well as neural reorganization, may be factors affecting the overt expression of neuromuscular performances. In various motor performances the onset of cortical functioning appears to progress in a cephalocaudal direction. The criteria proposed in the selection of the several phases of each activity have embodied those features which indicate the fundamental course of development without regard for individual peculiarities. On the other hand, individual variations may signify temporary differences as to the order in which various aspects of the function advance. For example, some infants may, at a given time, show greater advancement in the aspect of progression while others manifest control over the equilibratory in advance of progressive mechanisms. Such variations are relatively unimportant since all aspects are finally interconnected for the performance of an integrated act. However, there is reason to believe that variations as to the manner or order in which different aspects of neuromuscular development gain ascendency may provide a means for the study of predominating or identifying qualities in individuals.

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HYDROMETROCOLPOS IN INFANCY

Congenital Atresia of the Vagina With Abnormally Abundant Cervical Secretions

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THERE is a large variety of lesions in infancy, the chief clinical sign of which is a palpable and perhaps visible abdominal tumor. All of these lesions are encountered infrequently, even in hospitals or hospital services devoted exclusively to the care of infants and children. The nature of most of them is often not apparent until exploratory laparotomy permits direct visualization and palpation.

This paper is concerned with an unusual clinical entity which occurs in early infancy and which is characterized (1) by an atresia of the vagina and (2) by an abnormally copious secretion of fluid into the vagina and uterus proximal to the point of atresia. This results in the formation of a pelvic and lower abdominal tumor, the pressure from which may be great enough to interfere with the flow of urine and intestinal contents.

It seems desirable to report our experience with three infants suffering from such a lesion and, in particular, to describe both a method of establishing the diagnosis and the indicated treatment which is a simple operative procedure.

CASE REPORTS

Case 1.—Baby V., Massachusetts Memorial Hospital, No. 265318. This baby was born at the hospital at full term on Oct. 1, 1938. Two days after birth she was found to have a large, tense, round, lower abdominal tumor, the upper margin of which was above the level of the umbilicus. A short time later the house officer discovered what he called a rectocele. Further examination revealed that the abdominal tumor was cystic, that it was anterior to, and apparently apart from, the rectum, and that the bulging at the vaginal orifice was not a rectocele but probably part of the wall of the cystic tumor. This was suggested by the fact that it, too, was cystic and became more prominent when the baby cried. There was no structure resembling a hymen, leading us to believe, at first, that the protruding mass was an imperforate hymen. However, a probe could be passed a distance of about one centimeter into the vagina all the way around the mass, but no farther.

By means of a cystogram (Fig. 1), it was shown that the tumor did not communicate with the bladder. The latter, however, was seen to be pushed forward and compressed from behind and above. A diagnosis of vaginal cyst was made (we were not then aware of the more correct term), and when the baby was one week old, it was taken to the operating room for incision and drainage of the lesion.

It was thought advisable, if possible, to visualize the tumor by x-ray more completely than could be done with an ordinary flat plate. Accordingly, a needle was

From the Pediatric Surgical Service, Massachusetts Memorial Hospitals and the Surgical Service and Pathology Department of the Children's Hospital.

inserted into the protruding vaginal membrane and about one ounce of a turbid grayish fluid was aspirated with a syringe. An injection of 20 c.c. of diodrast into

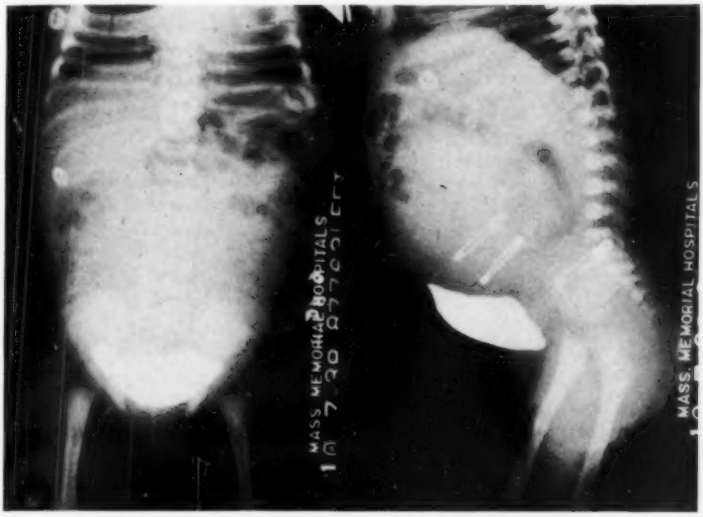

Fig. 1.—Case 1. Cystogram. Note deformity of bladder due to pressure of tumor outlined in Fig. 2.

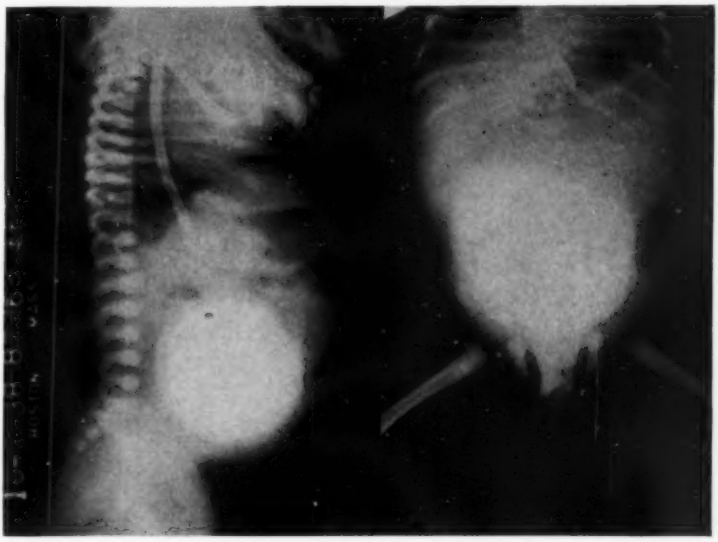

Fig. 2.—Case 1. X-ray film after injection of diodrast into cyst.

the cyst was then made and an x-ray picture taken. The plate outlined the mass as seen in Fig. 2 and indicated the proper method of surgical approach. The protruding membrane was then incised. There was immediate drainage of several ounces

of turbid fluid. The examining finger could easily be inserted full length into the vagina, and the markedly dilated wall could be felt to contract and gain tone almost immediately. Another x-ray picture was taken about 15 minutes after the incision, and it showed the uterus and vagina to be completely empty of the iodized fluid.

The postoperative course was uneventful, and the patient was discharged at the age of 13 days.

CASE 2.—E. H., Children's Hospital, No. 189352 (S35-58). This baby was admitted Feb. 12, 1935, at 3 weeks of age. She was discharged from a hospital in Berlin, New Hampshire, at the age of 12 days and 3 days later was found by the attending district nurse to have a lower abdominal tumor. At this time the father could not remember that the baby had passed any urine since leaving the hospital. It was readmitted to the hospital for catheterization. This had to be done repeatedly up to the time of admission to the Children's Hospital. The baby also had numerous watery stools without losing weight.

Examination revealed a large, cystic lower abdominal tumor and at the vaginal orifice a cystic bulging which became more prominent when the baby cried.

A correct diagnosis was not made, and an exploratory laparotomy and panhysterectomy were done before the nature of the lesion was apparent. The cystic structure proved to be the vagina which was greatly distended. It was amputated a short distance proximal to the membrane occluding it below with release of a large amount of turbid mucoid material. On March 8 the membrane at the vaginal orifice was incised. The postoperative course was uneventful, and the patient was discharged on March 17. She was last seen in the Outpatient Department on April 18, 1936. At this time her weight was 26 pounds, and she was in excellent condition.

Fig. 3.—Case 2. Surgical specimen. Posterior view, showing normal uterus and ovaries and tremendous dilatation and hypertrophy of the vagina.

Pathology.—On gross examination the specimen was seen to consist of an infantile uterus with ovaries and tubes, all of which were normal in size and appearance, and an elongated and greatly distended vagina. Its wall averaged 3 mm. in thickness.

The mucosa was pale gray, and the rugae were flattened and indistinct. There was slight dilatation of the body and cervix of the uterus (Figs. 3 and 4).

Microscopic examination of the vagina showed a thickened wall due to hypertrophy of the muscle, particularly of the circular bundles. The squamous epithelium lining the vagina was thinned, and the individual cells were compressed and poorly stained. Up to one-third of the epithelium was undergoing keratinization, and there was desquamation of the more superficial layers. There was no evidence of inflammation.

Fig. 4.—Case 2. Surgical specimen. The vagina has been opened by a vertical incision of the anterior wall.

The cervix uteri contained numerous active glands made up of cells which were full, sometimes vacuolated, tall and columnar in shape, and with nuclei close to the base.

Case 3.—M. H., Children's Hospital, No. 228219 (A38-184). This patient was admitted to the Surgical Service on Dec. 26, 1938, at 1 day of age with the diagnosis of imperforate anus. There was also a history of coughing and cyanosis with every attempt at feeding. Examination showed a well-developed and nourished female infant in moderate respiratory distress. The extremities were cold and cyanotic, and there were coarse râles throughout both lungs. There was no anal orifice nor was there any evidence of a rectovaginal fistula. X-ray examination revealed evidence of bronchopneumonia and also a distended duodenum indicative of high intestinal obstruction. On December 27 a duodenojejunostomy was done under local anesthesia, and on the following day a plastic operation on the anus was performed. The baby died suddenly that night.

Pathology.—Autopsy revealed an atresia of the esophagus and a tracheo-esophageal fistula. This had resulted in an aspiration pneumonia from which the baby died.

In addition to the anomalies already mentioned, there were several others including an atresia of the vagina with dilatation of the lumen by about an ounce of tenacious light yellowish mucoid material. This contained numerous epithelial cells and occasional leucocytes. The uterine cavity was slightly dilated, and the fornices of the vagina, obliterated.

After fixation of the specimen, it was found that the dilated lumen of the vagina was made up of two cavities, a large one and a smaller one anterior and distal to the larger. They were separated by a narrow septum, thought to represent a second point of atresia (Fig. 5). It could not be demonstrated with certainty that the septum was complete and that the two cavities did not communicate with each other.

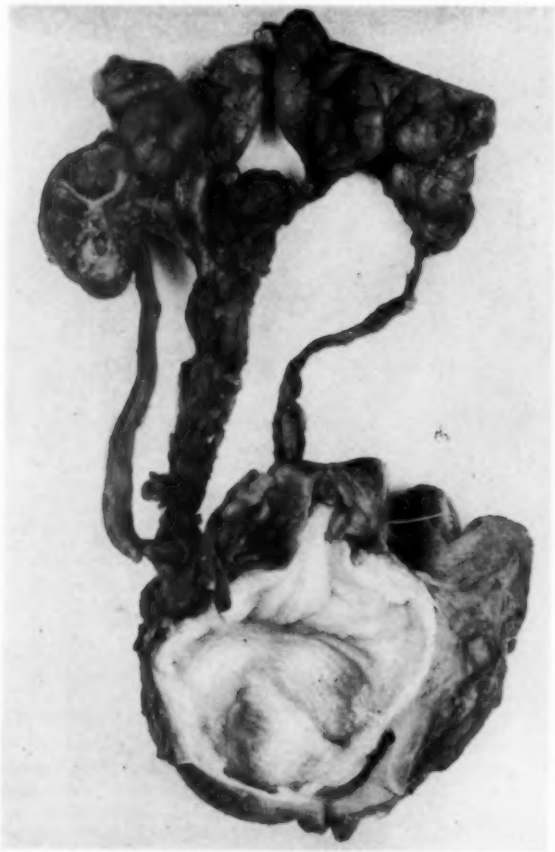

Fig. 5.—Autopsy specimen. Note obliteration of the fornices and second incomplete diaphragm in vagina.

Microscopic examination revealed distinct activity of the cervical glands. The individual cells were generally tall and columnar in shape and were frequently distended with secretion.

The stratified squamous epithelium of the vagina was compressed and pale staining, particularly in the superficial layers where there was keratinization and desquamation.

CASE 4.—D. T., The Babies Hospital, New York City.* This patient was admitted July 8, 1937, at 2 months of age with diarrhea of 6 weeks' duration and one bout of urinary retention for 24 hours one week before admission. The day

*Reported here in brief through the kindness of Dr. Camille Kereszturi, 1225 Park Avenue, New York City, who is preparing a separate report of the case.

before admission she became feverish, and on admission the temperature was 104° F. Further examination revealed a cystic mass which extended from the pubis to the umbilicus. There was also a smooth mass protruding between the labia. It was thought that this protruded *through* the vaginal orifice and that it was not an imperforate hymen.

There was evidence of urinary infection, and intravenous pyelograms revealed marked dilatation of the ureters and hydronephrosis.

An exploratory laparotomy was done one week after admission. This revealed a cystic mass extending up from the pelvis behind the bladder and pushing the bladder and uterus upward. Pressure applied to this mass caused the membrane between the labia to bulge. This membrane was incised with release of about 2 ounces of milky fluid and disappearance of the pelvic mass. Following operation, there was improvement in the urinary condition, and the patient was discharged on August 26.

NATURE OF LESION

The unusual condition found in these patients has been called hydrocolpos. It has also been called, and more properly since the uterus is involved, hydrometrocolpos. It consists of a cystic structure, the wall of which is an imperforate vagina together with the uterus. The canal of the latter is usually dilated though only to a slight degree. There are a marked dilatation and hypertrophy of the vagina; its epithelium is flattened instead of ridged; and the fornices are obliterated so that, on gross examination, the juncture of the vagina and cervix uteri cannot be distinguished.

The cystic structure described contains a thin, mucinous, cloudy, grayish, or yellowish-gray fluid in which are found desquamated epithelial cells. This fluid has been analyzed chemically by Commandeur who found appreciable quantities of "glucose." It should be noted here that the vaginal epithelium of adults contains glycogen, but, according to Dobszay,[6] it is not found in the vaginal epithelium of older infants and children. This is significant in connection with remarks to be made below concerning the pathology of the lesion.

Microscopic examination of the uterus and vagina in this condition reveals evidence of marked activity of the cervical glands and an adult type of vaginal epithelium. It is obvious that the uterine glands are the source of the fluid in the cyst. It should be pointed out, however, that this is the normal microscopic appearance of the uterine and vaginal mucosa at birth and for the first 10 to 14 days after birth. At the end of about the first 2 weeks of life, the cervical glands become relatively inactive in appearance, and there is a concomitant change in appearance of the vaginal epithelium. Instead of a thick covering of poorly staining cells with keratinization and desquamation, one sees a relatively thin epithelium of deeply staining cells with almost no keratinization or desquamation.

LITERATURE

A careful review of the literature has revealed very few reports of hydrometrocolpos. Commandeur[1] (1904) stated that 10 cases had been

reported up to that time by Godefroy, Breisky, Gervis, Bryck, Veit, Stroetter, Vitrac, Budlin, and Barnes and added a case of his own. Other cases have been reported since then by Cranwell[2] (1905), Bjerrum[3] (1915), and Bonnet[4] (1930). Spencer[5] (1916) made the only report we could find in the English literature although the standard English textbooks mention very briefly the rare occurrence of such a lesion. In the relatively numerous reports of hematocolpos, with complaints only at puberty or thereafter, it is occasionally stated that the imperforation may be discovered in infancy.

At first we were of the opinion that the obstruction of the vagina was due to an imperforation of the hymen. After study of the literature, particularly of the embryology of the vagina (vide infra), and after study of the cases here presented, we came to the conclusion that the obstruction may be due to an imperforate hymen, but that probably it is usually due to arrested development and failure of perforation of the vagina analogous to the failure of the rectum to communicate with the exterior in imperforate anus (or to incomplete involution of the central portion of the vaginal plate analogous to the arrest in development resulting in intestinal atresia).

To support our contention that the obstructing membrane is most often an atresia of the vagina and not an imperforate hymen, we would first call attention to the clinical findings in Cases 1, 2, and 4 reported above in which it was thought that there was a mass protruding *through* the vaginal orifice, and to the autopsy findings in Case 3 where the obstructing membrane was definitely above the level of the hymen.

Where careful study has been made in the cases reported in the literature, the occluding membrane has usually been found to be an atresia of the vagina. Cranwell[2] reports the instance of a 1-month-old infant which was thought to have an imperforate hymen with retained vaginal fluid and which also had retention of both urine and feces. The membrane was incised with release of fluid under pressure, but the patient died, and at autopsy it was discovered that the hymen was present and normal and that the vagina had been closed by a 1 mm. thick membrane just above it. This author quotes Pazzi as stating that the finding of the vagina closed by a thin membrane is usually due not to imperforation of the hymen, but to failure of perforation of the vagina. Bonnet[4] also reports a case in which the hymen was present and centrally perforated with a blind pocket above it due to an imperforate vagina.

There is a final point to be made. The membrane usually seen in this condition is a relatively thick structure. The hymen is normally thin, and if imperforate and stretched by retained secretions, it ought to be even thinner.

The preceding discussion raises the question as to what becomes of the hymen when a membrane occluding the vagina is forced down through the vaginal orifice by the pressure of retained secretions. It is our

opinion that it is flattened out and "taken up" into the wall of the orifice and that it reappears following incision of the membrane.

Explanation of atresia of the vagina should be based on some abnormality of or, more probably, an arrest in the development of the genital tract. Review of the literature reveals a considerable difference of opinion regarding the origin of the vagina and hymen. The most recent careful investigation of this problem that we have found is that of Koff,[7] who had at his disposal the collection of embryos of the Carnegie Institute of Washington. In a very convincing report he concludes that the upper two-thirds of the vagina is derived from the Müllerian ducts while approximately the lower third and the hymen are derived from the urogenital sinus. What is more to the point is the description of the ultimate formation of the lumen of the vagina from a solid cord by dissolution of the cells in the center of the cord in a manner similar to the formation of the lumen of the intestine.

If we accept this as correct, we can explain an atresia at any one or more points in the vagina as failure of dissolution of the cells at the involved points.

The relatively much larger number of cases of hematocolpos with symptoms of obstruction only at puberty and onset of catamenia suggests that the chief factor in bringing attention to the lesion in infancy is the amount of fluid secreted.

In the first few days of life, there is normally a viscid, grayish, mucoid discharge from the vagina. This is known to vary considerably in amount, and we must assume that, even in the presence of complete atresia of the vagina, it may be so little as to cause no complaint. In the case reported by Spencer[5] the baby was 11 weeks of age when the mother noticed a bulging at the vulva. Incision was done with release of only one dram of fluid.

The fact that the secretion is usually small in amount is the probable explanation of the failure to recognize atresia or stricture of the vagina until puberty and the onset of menstruation. Where the secretion is abundant, the resulting tumor and secondary urinary and intestinal obstruction draw attention to the lesion; where it is scanty, the lesion may go unnoticed. This is especially true where the atresia is some distance proximal to the vaginal orifice (Case 3). Unless there is considerable pressure, there will be no protrusion of membrane through the orifice, and the external genitals, including the hymen, will appear normal.

It has been stated above that during the first month of life, the cervical glands become inactive in appearance and that the vaginal epithelium changes from the adult type seen in the newborn infant to the thinner, more deeply staining epithelium characteristic of childhood. Clinically the discharge from the vagina becomes very small in amount or ceases at this time. Dobszay[6] has been able to reproduce in older infants the

anatomical and clinical, as well as chemical and bacteriological genital conditions that prevail in these first few days of life. He has done this by administration of large amounts (100,000 to 150,000 units) of estrogen. This and other considerations led him to the conclusion: "The estrogenic hormone of maternal origin physiologically produces the discharge from the vagina of newborn infants." This, together with the reported considerable variation of estrin in the urine of pregnant women, appears to us to account for the variation in amount of vaginal secretion. As already suggested, this is an important clinical factor in hydrometrocolpos.

In this communication we desire not only to direct attention to this relatively rare entity but also, as already stated, to stress the method of making a correct diagnosis. This will lead to the simple treatment described in Case 1, and avoidance of an exploratory laporotomy such as was done in Cases 2 and 4. A careful vaginal examination should be made in all infants presenting low abdominal tumors. If there is an obstructing membrane or cystic bulge in the vagina, aspiration of fluid should be attempted. If turbid fluid is aspirated, about 20 c.c. of diodrast, depending on the size of the tumor, should then be injected for the purpose of outlining by x-ray its true extent. This simple procedure establishes the correct diagnosis beyond doubt, and rules out other tumors that require laparotomy for treatment and often for diagnosis. Such tumors include mesenteric, ovarian, and urachal cysts, embryomas, lymphoblastomas, teratomas, anterior meningoceles, and intestinal duplications, most of which are encountered about as infrequently as the lesion under discussion.

SUMMARY

Hydrometrocolpos as a clinical entity is described. Our ideas on the nature of the lesion, based on clinical and pathological study and a review of what is offered in the literature of the embryology, are presented. Evidence is given that the presenting symptoms may be due to either intestinal or urinary tract obstruction. A new method of x-ray diagnosis is presented, and a simple method of treatment is suggested.

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RENAL GLYCOSURIA

A Hereditary and Clinical Study of One Family

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RENAL glycosuria is extremely uncommon if one uses the criteria of Marble.[1] These are a constant glycosuria in a fasting state, a fasting blood sugar value below 112 mg. per cent, a postprandial value below 170 mg. per cent, and an absence of diabetic symptomatology. Exception might be taken to the significance of continuous glycosuria since in intermittent glycosuria the renal threshold for sugar may be still abnormally lowered. The use of the above standards, however, makes classification more simple. The sugar excreted should be glucose. Of 14,000 patients with glycosuria observed at the Joslin clinic, 45 were proved to have renal glycosuria by the above criteria. This is an incidence of 3 per 1,000. The youngest patient with renal glycosuria studied by them was 4.8 years old. The youngest patient reported in the English literature appears to be that of Fischer,[2] a girl of 2.5 years who had had glycosuria since the age of 15 months.

The etiology of renal glycosuria is unknown. It is now believed that the glucose content of the glomerular filtrate approximates that of the blood plasma and that normally all the glucose is reabsorbed in the proximal tubules of the kidney. The "renal threshold" is reached when the tubular reabsorption is no longer able to remove all the glucose from the glomerular filtrate and the excess escapes in the urine. The average normal renal threshold has been shown by Campbell, Osgood, and Haskins[3] to lie between blood sugar levels of 140 and 190 mg. per cent in 80 per cent of normal subjects, while Knud Faber[4] has shown that individual differences are slight except during pregnancy. In renal glycosuria there is a marked lowering of the renal threshold for sugar. The current belief is that in these cases the glomerular filtrate remains constant while there is a lessening of the glucose reabsorptive function of the renal tubules. Recently Monasterio[5] has reported on the histologic material obtained by biopsy from the kidneys of a patient with renal glycosuria. This is the first case studied in this way. He found enormous dilatation of the tubules with flattening of the proximal tubular epithelium. These changes were neither inflammatory nor degenerative.

No other failure of kidney function has been found in these cases. Urea clearance and dye excretion tests were within normal limits.

In the differential diagnosis diabetes mellitus will be excluded by the use of the criteria mentioned. Tests for levulose, pentose, lactose,

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and galactose should not be omitted. Glycosuria of pregnancy should cause no confusion. Tubular nephritis is occasionally associated with constant glycosuria. Poisoning with heavy metals such as mercury not uncommonly is associated with glycosuria. Recently Goettsch and Mason[6] have found glycosuria in lead poisoning. These conditions apparently result in injury to the kidney tubules. Infections may temporarily produce glycosuria. Hyperthyroidism not infrequently causes glycosuria probably through the interaction with the pituitary and the pancreas. The glucose tolerance curve and blood sugar level are usually elevated in such cases.

The purpose of this paper is to present data on renal glycosuria found in three generations of the same family with special study of the youngest member who has the disorder.

FAMILY HISTORY OF GLYCOSURIA (SEE CHART 1)

The oldest living member of this family is Mrs. H. H., now 52 years of age, who has had almost constant glycosuria for twenty-one years. Her oldest brother was known to have sugar in his urine. He was said to have needed insulin but

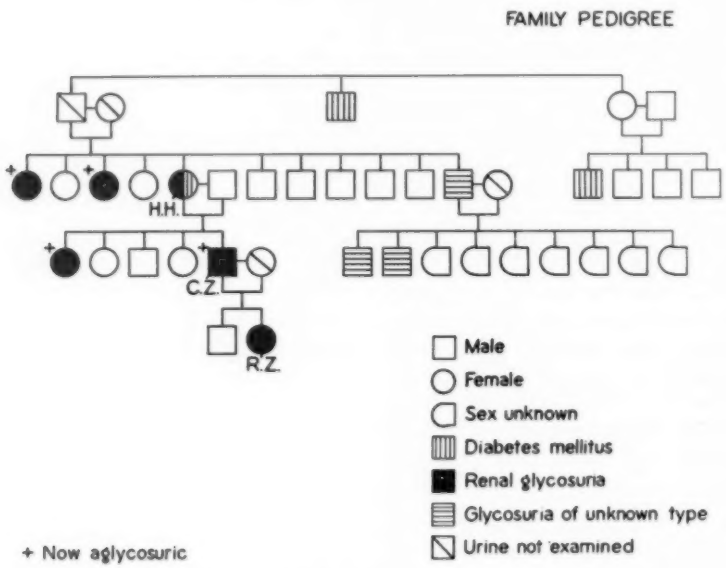

Chart 1.—Renal glycosuria is shown in three generations. On examination no sugar in the urine has been noted in members represented by the blank symbols.

died of a stroke at the age of 64 years. Two of her younger sisters are said to have had sugar in the urine; one of these has had a diagnosis of diabetes, but her urine is now free of sugar without any special treatment. We have no record of urinalysis of their parents, but an uncle is said to have had diabetes which required insulin treatment the last ten years of his life. He died of pneumonia

at the age of 84 years. A cousin is now said to have severe diabetes which has required his hospitalization. Mrs. H. H. has had no symptoms of diabetes until recently and has never taken insulin. Sugar was first discovered in her urine at the age of 31 years, when a suspension of the uterus was performed in a Lincoln, Neb., hospital in 1918. The first studies that we have available were made at the San Diego County Hospital* in 1925. At this time more than 1 per cent of sugar was found in the majority of urine specimens. Acetone appeared as the sugar in her diet was restricted. In 1926 glycosuria was not continuously found although the acetone reaction was constantly 3- to 4-plus. A blood sugar reading was 56 mg. per cent. Apparently the carbohydrate in her diet had been drastically reduced. In 1927 the same condition prevailed. A fasting blood sugar sample was 60 mg. per cent. There were no symptoms of diabetes. In 1930 urine sugar was found to be "2-plus" repeatedly, but the acetone had disappeared. Fasting blood sugar values were 111, 103, and 105 mg. per cent. These findings suggest that she had increased her intake of carbohydrate. At this time she began to feel poorly. She became nervous, and a metabolism test was reported as +72 per cent. Her blood pressure rose, and she suffered attacks of cholecystitis. Her urine sugar output increased, and fasting blood sugar values as high as 140 mg. per cent were reported. In the last year, however, she has felt better. Her metabolic rate has become normal and her urine sugar output has decreased. In April, 1939, the fasting blood sugar level was 110 mg. per cent; in October, 1939, we observed a rise to 150 mg. per cent; and in May, 1940, it had risen to 152 and 170 mg. per cent. A glucose tolerance curve at this time is shown in Chart 2. This shows a diabetic type curve. With the patient fasting, the urine contained no sugar on two occasions, the first time fasting urine has been found negative for sugar for many years. This represents a marked rise in her renal threshold.

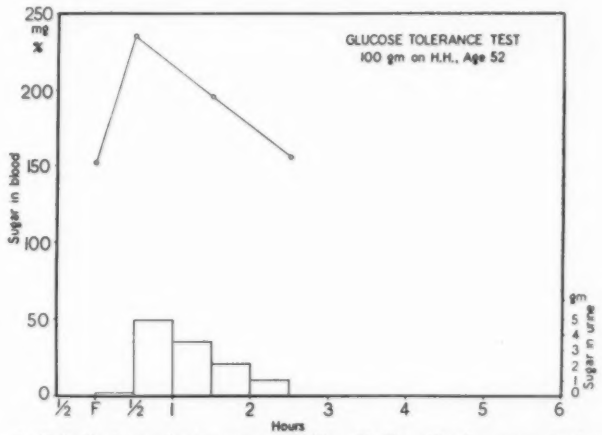

Chart 2.—A diabetic type glucose curve on Mrs. H. H. with the amount of sugar (in grams) excreted in the urine shown at half-hour intervals.

Mrs. H. H. has five children. The oldest, C. Z., aged 32 years, has had known glycosuria for nine years. Her youngest daughter had glycosuria for one year at the age of 8 years. This has now cleared. C. Z. was found to have sugar in his urine at the time of a routine examination in 1930. He has had no symptoms of diabetes. A glucose tolerance curve was normal, but 2.6 Gm. of sugar were excreted during

*Dr. B. A. Adams, Superintendent of the San Diego County Hospital, has very kindly supplied us with this information.

the test. Glycosuria has been intermittent, but he tends to limit his carbohydrates. During the past year he reports less sugar than formerly. In May, 1940, a glucose tolerance curve was run in the Stanford Clinic. The curve was normal, and no sugar was found in the urine. A comparison of the two curves is shown in Chart 3. The rise in the renal threshold appears definite.

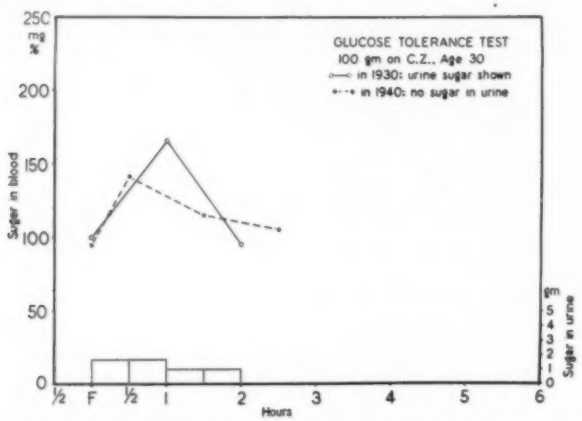

Chart 3.—The above curves represent tolerance tests on Mr. C. Z. at a ten-year interval. The amount of glucose excreted in 1930 is shown. No glycosuria occurred in 1940.

C. Z.'s wife occasionally showed sugar in her urine during the pregnancy with her first-born. A glucose tolerance curve was normal, but 1.5 Gm. of sugar was recovered in the urine. The type of sugar was not determined. No sugar was found in her urine during her second pregnancy, and recent urines have shown no reaction to Benedict's reagent. This case was probably one of glycosuria of pregnancy.

The two children of this union are boys. The case of the older child, R. Z., will be presented in detail. The younger, K. Z., 2.5 years old, has a sugar-free urine except after a meal liberal in carbohydrate.

R. Z., a 4-year-old American boy, was admitted to the Children's Ward of the Stanford University Hospital in October, 1939, with the chief complaint of sugar in the urine. His family history, except for glycosuria, was unimportant. He had gained normally and was said to have enjoyed good health. A routine urinalysis at the age of 3 years showed no sugar. Efforts to discover any symptoms of diabetes were unrewarded. The diet had been average except for a restriction in the intake of carbohydrate, which had become a family custom, mainly through fear of their supposed tendency to diabetes.

He was a healthy looking white boy of 4 years, 100.5 cm. tall, weighing 18 kg. No physical abnormalities of any kind were apparent.

The laboratory examination revealed a normal blood count and sedimentation rate. Wassermann and tuberculin tests were negative. The urine was clear with a specific gravity of 1.035, a sugar reaction of 3-plus, acetone 3-plus, and diacetic acid 1-plus. The urinary sediment was negligible. The urine sugar was found to be glucose by the osazone, fermentation, and Selivanoff tests. Carbon dioxide combining power was 35.3 volumes per cent.

A single dose glucose tolerance curve after the ingestion of 32 Gm. of glucose (1¾ Gm./kg.) revealed a sustained rise (see Chart 4). Sugar estimations were done on venous blood after the method of Folin and Wu. Sugar and acetone were present in all urine specimens.

The following day an insulin tolerance test was carried out as shown in Chart 5. Five units of regular insulin were given subcutaneously when the blood sugar was at a fasting level of 74 mg. per cent. Sugar failed to appear in the urine after the blood sugar had fallen below 50 mg. per cent. Samples of urine and blood were taken every half hour.

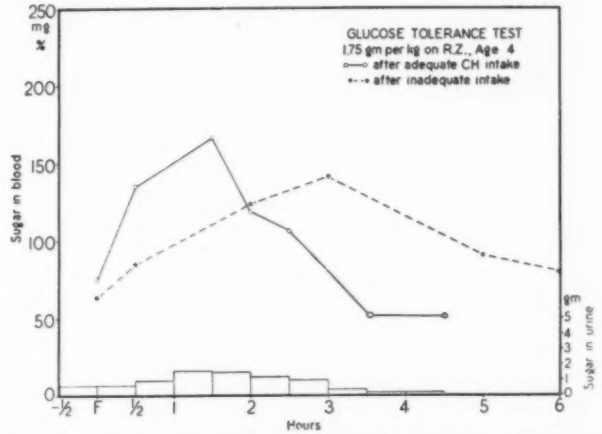

Chart 4.—Comparison sugar curves on R. Z. carried out five days apart. The first (solid line) shows a long curve after a diet insufficient in carbohydrate. The second curve (broken line) is a more normal curve after the carbohydrate intake had been increased. Sugar output was measured at the time the second curve was made.

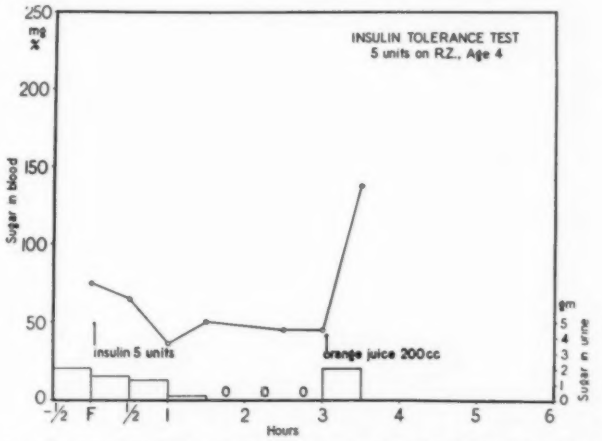

Chart 5.—The effect of insulin on the blood sugar in relation to the renal threshold is shown here. Sugar ceases to appear in the urine when the blood sugar drops below 50 mg. per cent.

In Chart 6, the urinary output of sugar is shown after the ingestion of 32 Gm. of glucose on an empty stomach. The amount of acetone is also shown and appears to vary inversely with the sugar output. At the peak of sugar output the acetone had entirely disappeared from the urine only to reappear toward the end of the test.

A second glucose curve is shown in Chart 4. This, in contrast to the first curve (shown in the same chart), was recorded five days after a liberal carbohydrate diet had been given. There is a significant change from the first curve in that the blood sugar rise occurred more rapidly and was less prolonged.

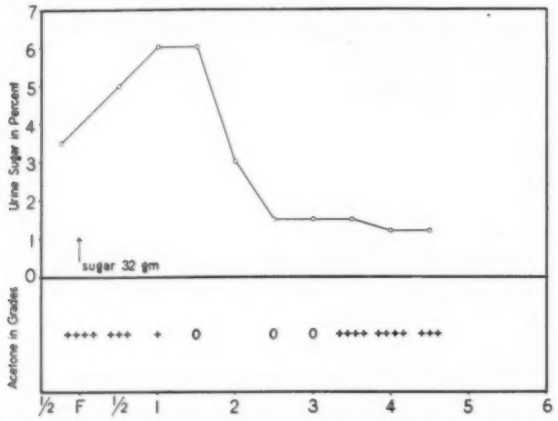

Chart 6.—The effect of the ingestion of sugar on the acetonuria. It disappeared as the blood and urine sugar increased.

On a weighed diet containing a total of 65 Gm. of actual and potential glucose, approximately 10 Gm. were recovered in the urine. On a diet containing 150 Gm. of actual plus 30 Gm. of potential glucose, 20 Gm. were recovered in the urine. These results were carried out with a standard fluid intake of 1500 c.c. of fluid since Thomas and Southworth[7] have shown that increasing the intake of fluid temporarily increases the amount of sugar in the urine. They also found a proportional increase in urinary sugar on raising the glucose intake. During the past winter we have frequently measured the twenty-four-hour glucose output and found that on a diet fairly liberal in carbohydrate, 40 to 60 Gm. of glucose were recovered in the urine.

COMMENT

It appears at the time of admission that the patient was on a low carbohydrate diet. This alone might not have given him the ketonuria and the carbon dioxide combining power of 35.3 volumes per cent, but with partial removal of the ingested sugar through the kidneys it seems probable that, as in so-called "starvation diabetes," his tissues were burning but little sugar; the excessive use of fat for energy production led to the formation of ketone bodies. The prolonged sugar curve in Chart 4 is similar to the sugar curves seen in patients receiving high fat diets. Kohn, Fries, and Felshin,[8] Ellis,[9] and others have shown that in children fed ketogenic diets there is a reduced sugar tolerance resulting in higher and more sustained curves than the normal. On increasing the carbohydrate intake the sugar tolerance becomes normal again (Chart 4). Himsworth[10] has shown in normal subjects that "the sole dietary factor governing sugar tolerance is the absolute amount of carbohydrate in the preceding diet; with progressive restriction of the

dietary carbohydrates there is progressive impairment of sugar tolerance, which is shown by a corresponding heightening of the blood sugar curve." He goes on further to say that "under the same condition sensitivity to insulin is depressed." The production of insulin coma in the treatment of schizophrenia has been found to raise the glucose tolerance curve.* This, observed in many healthy patients by Appel and Hughes,[11] suggests that the pancreas was temporarily spared the task of insulin production, thus relieving it of the need for maintaining a ready source of extra insulin. Sugar starvation may act in the same way. Best, Naist, and Ridout[12] have found reduced quantities of insulin in the pancreas of dogs on low carbohydrate diets.

It is noted that in Chart 4 the blood sugar level remains at 52 mg. per cent for 1 hour. During this time traces of sugar were repeatedly found in the urine. This corresponds with the insulin tolerance curve where we find that the sugar is not completely absorbed from the glomerular filtrate until the blood sugar has fallen below 50 mg. per cent. It should be kept in mind that there is a small factor of delay in collecting urine although urine specimens were obtained at least every half hour. There is also a slight difference between arterial and venous blood, our work being done entirely with the latter. This patient has the lowest renal threshold for sugar that has come to our attention.

The disappearance of ketone bodies from the urine after a more liberal carbohydrate diet was quite striking. During the end of his hospital stay none was found in many examinations of urine. The carbon dioxide combining power of the blood rose from an admission figure of 35.6 to 53.2 volumes per cent during this time. Ketonuria had also been present for years in the grandmother, Mrs. H. H., during the period of her reduced carbohydrate intake. Many cases of transient ketonuria have been reported in association with renal glycosuria, but they are nearly all incidental to illness, operation, or accident, when the diet is temporarily disrupted.

It is interesting to note that ketone bodies temporarily disappeared from the urine after a glucose meal (Chart 6). This would seem to indicate that the formation of glucose from noncarbohydrate sources, made necessary by the low glycogen storage, was suddenly held in abeyance because of the flooding of the system with fresh glucose following the glucose meal. The paucity of liver glycogen is shown by the recurrence of ketonuria as soon as the blood sugar has fallen. A similar effect was observed by Himsworth[13] in a diabetic who was given 50 Gm. of glucose by mouth after the excretion of ketone bodies had reached a constant level. Coincidentally with a rise in blood sugar the ketonuria and excretion of urinary nitrogen diminished, but as the

*An adult patient with renal glycosuria has recently been treated with insulin injections on the psychiatric ward for schizophrenia. After twenty periods of coma a glucose tolerance curve showed an impairment of tolerance with a rise in the blood sugar level to 200 mg. per cent. A normal sugar curve has been observed before and two months after treatment with insulin. These findings are similar to those found in patients with normal renal thresholds.

blood sugar fell the ketonuria increased. He explains this on the basis that the glucose temporarily spared the liver the task of forming carbohydrate from noncarbohydrate sources, thus inhibiting the formation of ketone bodies.

There appears to be a marked familial tendency in renal glycosuria. Marble[14] found a family history in 73 per cent of the cases he studied. Weber[15] described women with renal glycosuria, four of whose five children developed the same condition. Because of the comparatively recent discovery of the syndrome, few studies of its hereditary nature have been made. The most complete and extensive study is that of Hjärne,[16] who showed quite clearly that a lowered threshold for sugar was transmitted as a monofactorial dominant character in three generations. None of his patients had a continuous glycosuria, but there is no doubt that their renal thresholds for sugar were lowered. We have recently studied a father and his 5-year-old daughter who both have nearly continuous glycosuria with normal sugar tolerance curves. There is a history of sugar in the urine in one of the grandparents.

The family pedigree presented here shows renal glycosuria transmitted directly in three generations as a dominant characteristic. This form of inheritance is in contrast to the inheritance of diabetes mellitus. Joslin[17] demonstrates that diabetes is inherited by a single recessive gene with perhaps one or two other minor factors. Schnell[18] has shown in one family the inheritance of diabetes as a recessive character on one side of the family as opposed to the inheritance of renal glycosuria on the other. Hjärne[16] has shown that diabetes mellitus has no effect on the hereditary transmission of renal glycosuria. Renal glycosuria begins most often in young adulthood, whereas diabetes mellitus is most commonly discovered in the fifth decade.

PROGNOSIS

There has been a tendency in the past for the clinician to classify cases of renal glycosuria as cases of potential diabetes, with the belief that a certain percentage progress to diabetes. However, the lack of such progression has been repeatedly shown. Marble[1, 14] has found that no case of diabetes developed in his carefully studied series of forty-five cases even though one patient had been followed for thirty-six years. His analyses of reported cases of renal glycosuria alleged to have become diabetic show conclusions drawn from unconvincing evidence. Vatcher and Douglas[19] from their study of war pensioneers with renal glycosuria conclude that diabetes does not develop in such patients. Hjärne's study[16] of glycosuric families disclosed no evidence of the transition of renal glycosuria to diabetes mellitus. Holst,[20] after studying 200 persons with nondiabetic glycosuria, makes the statement that "glycosurias with normal fasting blood sugars all have a benign course without respect to type." These authors remark that any possible association of the two conditions in one person would be coincidental.

From time to time cases of diabetes with low renal threshold for sugar are reported (Powelson and Wilder[21] and Curran and Mills[22]). Marble[23] finds that such associations are extremely rare. One could presume that diabetes was superimposed on the renal glycosuria in such cases and that the reason for more such association not occurring could be found in the tendency of the renal threshold to rise with increasing age especially in diabetics, as noted by Lawrence.[24] The lessening in severity of cases of renal glycosuria with advancing age has been noted by Vatcher and Douglas.[25] They found no cases in the aged.

The number of diabetics in families in which renal glycosuria occurs is greater than the normal expectancy in the general population. Family pedigrees studied by Hjärne[16] and Holst[20] have shown this, and it is also true of the family presented in which there have been at least three diabetics in a total of thirty members in the three generations of whom we have records. It therefore seems likely that the presence of renal glycosuria in a given family increases the chances of superimposed diabetes both in the members with renal glycosuria and in those without it.

Studies of the grandmother, Mrs. H. H., suggest that her renal glycosuria, which undoubtedly existed for a great many years, has now disappeared and has been replaced by diabetes. Chronic cholecystitis and cardiovascular disease may have contributed to this. Her high glucose curve with a fasting blood sugar of over 150 mg. per cent is certainly compatible. That her renal threshold has risen to within normal limits is demonstrated by negative urine sugars with fasting blood sugar values of 150 and 170 mg. per cent. Fifteen years ago, however, fasting blood sugar levels of 55 and 60 mg. per cent were reported in association with sugar found in the urine. Unfortunately no glucose tolerance curve was done at this time, but it seems fairly safe to postulate that diabetes was not present at that time.

Mrs. H. H. is now diabetic. That this is due to chance is certainly a possibility. The continuous glycosuria in this case associated with a low carbohydrate intake, however, might very well give her a predisposition to diabetes mellitus. Himsworth,[26] although realizing the influence of heredity and obesity on the development of diabetes, feels that carbohydrate restriction over long periods of time is an important factor. Such a diet has been shown by him to increase insensitivity to insulin. The same factor could well play a part in any case of renal glycosuria where sugar loss is significant. A loss of sugar through the kidneys necessary to produce insufficient carbohydrate utilization is rare in renal glycosuria. Therefore, if Himsworth's contention is tenable, the occasional unwarranted restriction of carbohydrate in these cases might be a more likely explanation of the increased numbers of diabetic persons in these families with renal glycosuria.

The tendency of the renal threshold to rise as we have found in both Mrs. H. H. and Mr. C. Z. makes these possible changes more difficult to

evaluate. Mr. C. Z. now has no sugar in his urine after sugar tolerance test. The previous glycosuria in other members of the family, which has now disappeared, is also suggestive of the gradual rise in the renal threshold for sugar that appears to occur in this condition.

TREATMENT

No special form of treatment is usually necessary. The diet should *not* be restricted. On the contrary there should be sufficient additional carbohydrate in the diet to offset the loss of sugar in the urine. This will prevent ketosis and maintain an adequate glycogen reserve.

SUMMARY

1. An American family has been observed in which renal glycosuria has been transmitted directly through three generations as a dominant character.

2. The eldest member, who has had glycosuria with normal fasting blood sugar levels for twenty years, has developed diabetes mellitus with a normal renal threshold.

3. A rise in the renal thresholds for sugar to within normal limits has been observed in two cases of renal glycosuria.

4. Clinical studies have been reported on a 4-year-old member of this family who exhibited ketonuria, mild acidosis, and a renal threshold for sugar below 50 mg. per cent.

Acknowledgment is made to Dr. Harold K. Faber and Dr. David Rytand for suggestions in the preparation of this paper. Dr. Otto Will and Dr. David Karnofsky have given technical assistance.

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DERMATOMYOSITIS IN CHILDHOOD

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BALTIMORE, MD.

DERMATOMYOSITIS is a relatively rare disease first described in 1887 by Wagner,[1] Hepp,[2] and Unverricht,[3] independently. Unverricht, in a later communication, gave the disease its name. Oppenheim[4] pointed out the frequent involvement of mucous membranes and suggested the name mucodermatomyositis; he also called attention to the similarity between this disease and generalized scleroderma. Steiner[5, 6] (1922) was the first American to report a case of dermatomyositis. Lorenz,[7] in 1904, described fully the symptomatology and known pathology of the disease and reviewed its literature to that date. Among the more recent papers, those of Stuckey[8] and Marcus and Weinstein[9] contain excellent descriptions and comprehensive bibliographies. The paper of Talbott and co-workers[10] contains typical photomicrographs of skin and muscle lesions. In 1932, Karelitz and Welt[11] reviewed the literature on dermatomyositis in childhood; they found eighteen reported cases and added two. In 1934, Rudolph[12] reported a case of childhood dermatomyositis complicated by calcinosis universalis. Rothstein and Welt[13] (1936) published a review of calcinosis universalis in childhood, including two cases associated with dermatomyositis. That year Keller,[14] using the capillary microscope, reported that the superficial capillaries of a child with dermatomyositis were spastic on the arterial and atonic on the venous ends of the loops. He could not confirm Frontali's findings of capillary widening and blood lake formation except in the presence of ulceration.

Dermatomyositis, as a rule, runs a subacute or chronic course, although relatively acute cases have been described. The onset is usually insidious, with fever of varying degree, malaise, lassitude, and anorexia. Rash may appear early, but is quite variable. The most characteristic early skin lesion is a patchy erythema, faintly indurated, dry, sometimes slightly scaly. The face is often involved. Redness of the skin of fingertips and over bony prominences is common. Other types of rash have been found less frequently, such as urticarial, erysipeloid, and purpuric lesions. The skin involvement may be profuse or scanty. It may clear up completely or lead to atrophy.

Edema usually appears in the course of the disease; the skin is brawny and pits scarcely, if at all, on pressure. The distribution and extent vary, frequently coinciding with underlying muscle damage. As a rule, the edema subsides after a few months.

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The muscles suffer most in dermatomyositis. They are frequently painful and more or less tender, always weak, never entirely paralyzed. Extensive contractures set in within a few months of onset of the disease. The entire skeletal musculature is susceptible. The muscles of the extremities are most frequently attacked, the trunk muscles somewhat less often. Muscles of respiration, phonation, and deglutition, as well as the extraocular muscles, may be involved. Myocarditis has been reported, but convincing cases are rare. Lorenz regarded the evidence for cardiac involvement inadequate in most cases. He believed that myocarditis occurred rarely, if at all, in dermatomyositis, but did generally occur in polymyositis hemorrhagica. Some authors, however, consider the latter a form of dermatomyositis and not a separate entity. Tachycardia and impairment of heart sounds are often noted in dermatomyositis. Blood pressure may be elevated. Cardiac decompensation is uncommon. Smooth muscle involvement has been reported in generalized scleroderma but not in dermatomyositis; Longcope and MacCallum[15] have found thickening of the walls of stomach and intestine in scleroderma.

Relapses and remissions mark the course of dermatomyositis. The mortality rate is about 50 per cent. Calcinosis universalis intervenes in some cases. This consists in the deposition of calcium in subcutaneous tissues, around joints, along tendons, muscle sheaths, and septa. The calcium-containing nodules may cause liquefaction necrosis and frequently excite pyogenic infection and give rise to draining sinuses.

On section, the skin in dermatomyositis shows, in early stages, edema, a variable amount of lymphocytic infiltration, especially around blood vessels, and in some cases, thickening of the walls of arterioles with narrowing of their lumens. The subcutaneous tissue shows similar changes. In late stages the skin may be atrophic and subcutaneous fat may be absent. Muscles display lymphocytic infiltration, mainly perivascular, loss of striation, fragmentation, vacuolization, and multiplication of nuclei.

The etiology of dermatomyositis is unknown. The disease has generally been assumed to be of infectious origin, although Köster[16] early suggested vascular origin. No organism has been found with any regularity.

CASE REPORTS

Case 1.—H. B. (H. L. H. 68451),* white girl born in February, 1919, gave family and past histories which were noncontributory. Onset of the present illness occurred in December, 1929, at the age of 10 years. The earliest symptoms were redness about the nostrils, anorexia, drowsiness, and malaise. The ankles and small joints of the hands soon became stiff; puffiness and reddish discoloration of the skin about the eyes set in. Her temperature ranged up to 102° F. (by mouth), and weakness necessitated bedcare. Two months after onset the patient was admitted to Babies Hospital in New York City. Gingivitis and subcutaneous nodules were

*This case has been reported previously by Dr. E. A. Ramsdell,[17] of White Plains, N. Y.

found, in addition to the skin changes and weakness. Comprehensive laboratory studies were unenlightening. There was rapid weight loss. The child was later taken South, but the warmer climate did not help. In May, 1930, five months after onset of the illness, contractures were noticed.

The patient was admitted to the Harriet Lane Home Sept. 7, 1930. Admission findings were: temperature, 38.2° C. (rectal); pulse, 140; respirations, 28; weight, 22.4 kg. Nutrition was poor. There were decubitus ulcers over the sacrum and right elbow, subcutaneous nodules, generalized branny desquamation, redness and thinning of skin over bony prominences and fingertips, and areas of brown pigmentation and of leucoderma. Hair was scanty, and the eyelashes were long. Gingivitis was present. The lungs were clear. The heart was not enlarged; there was no murmur; rapid action. Blood pressure was 90/70. The spleen and right kidney were palpable. The muscles were atrophic, not tender. Motion of the right elbow and both knees was limited. A roentgenogram showed calcium deposits around joints, and a biopsied nodule contained calcium. Blood pressure rose to 120 to 140 systolic and 108 to 115 diastolic. Urine contained albumin occasionally; kidney function tests normal. Serum calcium was 10.5 and 8.5 and inorganic phosphorus 5.4 and 3.1 mg. per cent on two occasions, respectively. The basal metabolic rate was −12, and later +30. Blood analysis showed: white blood count, 4,500; polymorphonuclear cells, 58 per cent; small lymphocytes, 22 per cent; large lymphocytes, 18 per cent; monocytes, 2 per cent; red blood count, 4,700,000; hemoglobin, 80 per cent.

The skin was improved by local measures, and orthopedic means were employed to combat contractures. The patient was discharged in December, 1930, only slightly improved.

Upon returning to New York City, the child came under the care of Dr. Phyllis Kerr, now of White Plains, N. Y. Various therapeutic measures were attempted, such as administration of large doses of potassium iodide and injections of progynon and pancreas extract. In March, 1933, the left lobe of the thyroid and what was described as the "parathyroid bearing area" on that side were removed by Dr. Ramsdell. Microscopic section showed thyroid hyperplasia; it did not contain parathyroid tissue. Recovery was uneventful. Two months later some of the calcareous nodules softened and discharged. A few weeks later erysipelas set in; the patient was very ill, but recovered. Patches of scleroderma appeared from time to time during the next year, but nodules diminished and the general condition improved steadily. Dr. Kerr wrote (September, 1939, ten years after onset) that the patient had been practically well for several years. A mild scoliosis and shortening of both achilles tendons were present at this time, however.

Case 2.—M. H. (H. L. H. 63316), a white girl born March 13, 1928, gave a noncontributory family history. Birth, feeding, and early development were normal. She had had pyuria at 14 months of age, with prompt recovery. At 22 months the child became fretful, and the mother noticed stiffness of knee joints. Some weeks later edema set in.

The patient's first admission to Harriet Lane Home was on April 8, 1930, at the age of 25 months. Findings were generalized edema with little or no pitting and a miliaria-like rash. There was marked general muscular weakness, but the other physical findings were normal. Urinalysis was negative. Blood analysis showed red blood count 4,300,000; hemoglobin, 80 per cent; white blood count, 6,500; polymorphonuclear cells, 49 per cent; large lymphocytes, 14 per cent; small lymphocytes, 35 per cent; eosinophiles, 2 per cent. Serum protein was normal. X-ray films showed atrophy of the long bones, probably due to disuse, enlargement of mediastinal glands, and an area of increased density at the base of the right lung. Tuberculin tests were negative.

A slight fever persisted, and for weeks the child could hardly move. Edema subsided, but contractures set in and attempts were made to relieve them. Calcium deposits were found in August, 1930, about eight months after onset of the illness. Biopsy of the gastrocnemius muscle showed slight round-cell infiltration and atrophy of muscle fibers. There followed periods of improvement and of relapse and occasional bouts of high fever. An abscess in the gluteal region required incision and drainage. The child left the hospital in April, 1931.

On May 28, 1931, the child was readmitted to the Harriet Lane Home because of high fever. During her few weeks at home she had had measles. A roentgen film of the chest suggested lipoid pneumonia. After the fever subsided, the patient was transferred to Happy Hills Convalescent Home. There she remained for nearly a year, during which a tonsillectomy and adenoidectomy were performed. Improvement was slow. Massage and baking were employed, and progress was satisfactory. In January, 1933, a relapse followed a respiratory infection. In March, 1934, nearly four years after their appearance, some of the subcutaneous nodules softened and discharged. Serum phosphatase, which had been 9.6 Bodansky units in May, 1933, was then 6.4. Magnesium carbonate administration had no apparent effect upon the calcium deposits. Tenotomies were performed for bilateral foot drop. In November, 1934, an acutely inflamed appendix was removed. During the winter of 1935-1936, improvement became more rapid; by December, 1936, the patient was carrying on a normal existence. The adenoids were removed again in January, 1936. In October, 1939, nine years after onset, she had good muscle power, no calcium deposits, and practically no residua.

CASE 3.—M. C. (H.L.H. 87361), a white girl born June 18, 1931, gave a noncontributory family history. Birth, feeding, and development were normal. There were frequent minor illnesses, and following pertussis in the winter of 1933-1934, the child became progressively weaker. Walking became difficult, and there was pain in the knees and legs. On April 18, 1934, about ten weeks after onset of symptoms, the patient was admitted to the Harriet Lane Home.

Examination on admission revealed generalized muscle tenderness and weakness and inability to walk more than a few steps. The deep reflexes were active. The skin was mottled; there was no rash. Except for reddened gums, the examination was otherwise negative. Urinalysis was negative, and spinal fluid normal. Gastric analysis showed no free hydrochloric acid (histamine not given). A skin test for trichiniasis was negative. Blood count showed: red blood count, 4,610,000; hemoglobin, 88 per cent; white blood count, 8,800; polymorphonuclear cells, 64 per cent, small lymphocytes and large lymphocytes, 23 per cent; eosinophiles, 7 per cent; basophiles, 2 per cent. Blood lead was normal.

The patient was irritable. The skin of the fingertips became reddened and the face took on a chapped appearance; dermatographia was marked. Biopsy of muscle on June 4, 1934, showed round-cell infiltration and slight atrophy of fibers. The child was discharged June 9, but returned five days later with fever, slightly injected tonsils, and erythema over the face and shins. Tonsillectomy and adenoidectomy were performed two weeks later. Alpha streptococci were cultured from the tonsils. A second biopsy was performed, with findings essentially similar to those of the first. The patient's legs were placed in casts, and diathermy was instituted. On Sept. 6, 1934, the child left the hospital, able to walk a little.

At home episodes of fever recurred frequently and weakness persisted. Puffiness of the face and ankles occurred intermittently. There was considerable joint pain. On Aug. 8, 1935, the child was readmitted to the Harriet Lane Home. She had developed subcutaneous calcium deposits, contractures, and a blotchy erythema. Diathermy and traction were employed. A staphylococcus abscess formed behind

the left knee and required incision. After that, the child was transferred to Children's Hospital School for orthopedic care.

One month later the patient was brought back to the Harriet Lane Home with erysipelas. She was critically ill for several months, the infection spreading wavelike over practically the entire body, recurring twice after it had apparently subsided. Otitis media, sinusitis, and numerous streptococcic abscesses occurred as complications. Treatment in the main consisted of ultraviolet light and numerous small blood transfusions. On April 16, 1936, fully recovered from erysipelas and its complications, the child returned to her home.

From that time on, improvement was steady; strength increased and contractures were eventually overcome. The family moved to another state. When heard from in November, 1936, the child apparently was well. She visited the Harriet Lane Dispensary in September, 1939 (five years after onset of illness). Although undernourished, she had no deformity or weakness and no calcium deposits.

CASE 4.—R. B. (H.L.H. 83911), a white male born June 6, 1931, gave a noncontributory family history, a normal birth and neonatal period. He was breastfed for nine months. In the summer of 1932 he developed diarrhea but had no other illnesses. In November, 1932, a "chapped" area appeared on the right leg and spread to the ankle. An abscess formed, discharged at the right internal malleolus, and healed, but the redness persisted. Skin over the knees became red and scaly, and transitory erythematous patches which itched slightly appeared around the joints and on the face. "Purple" areas are said to have been seen on the scalp; the hair fell out. Hands, legs, face, and eyelids were swollen from time to time. The joints became stiff. The child was irritable, grew steadily weaker, finally could not walk. Fever was variable.

On Aug. 8, 1933, the patient was admitted to the Harriet Lane Home. Admission examination showed: temperature, 37.2° C. (rectal); pulse, 126; respirations, 30; weight, 14.5 kg. Skin examination showed erythematous patches on the face, knees, and wrists, with a nonpitting generalized edema. The scalp was scaly. The heart was slightly enlarged to percussion; systolic murmur was heard best medial to the left nipple, but was poorly transmitted. A gallop rhythm was present. Blood pressure was 108/60 in the arm, 128/80 in the leg. The liver and spleen were palpable. There were generalized extreme weakness, foot drop, restriction of movement at the knees, and pain on moving the legs. Reflexes were normal. Laboratory data were: hemoglobin, 89 per cent; red blood count, 4,940,000; white blood count, 6,350; polymorphonuclear cells, 64 per cent; small lymphocytes and large lymphocytes, 28 per cent; monocytes, 8 per cent. Serum calcium and inorganic phosphorus, on two occasions, were 10.1 and 11.1 mg. per cent and 4.9 and 3.8 mg. per cent, respectively. Total fixed base was 158 c.c. N/10; nonprotein nitrogen, 28 mg. per cent; plasma chloride, 107 meq.

Biopsy of muscle in the right thigh showed scattered areas of perivascular round-cell infiltration and muscle degeneration (Fig. 1). Throat culture yielded beta hemolytic streptococci. An electrocardiogram revealed a slightly prolonged P-R interval for age and rate (0.16 to 0.20 second); the size of the heart, determined by teleoroentgenogram, was at the upper limit of normal.

As an experiment, one arm was treated with deep x-ray therapy. No improvement was noted and the radiation was not repeated. At the time of discharge, Sept. 5, 1933, the skin over the extensor surface and joints appeared atrophic, and there was erythema about the eyes. The skin elsewhere felt thickened. There was nonpitting edema of the face and extremities. Heart sounds were poor, with gallop rhythm; no increase in cardiac size was evident. The liver was palpable 4 cm. below the costal margin. Skeletal muscles felt abnormally firm and were slightly tender.

Moderate contractures of the gastrocnemius group existed. No calcium deposits were demonstrable. The legs were in casts.

The child was taken to Indiana for two months and then returned to Florida, where he was cared for by Dr. Council C. Rudolph of St. Petersburg. From time to time there were febrile episodes, purpuric manifestations, cervical adenitis, and gingivitis. On Dec. 24, 1934, the patient fell, striking his right arm, which later became swollen. X-ray films showed subcutaneous calcium deposits, but no fracture. High fever set in, and five days later the child died. Autopsy revealed a suppurative myositis, but no organisms grew on culture. In addition, early bronchopneumonia and early degenerative changes in the liver were found. The myocardium appeared normal.

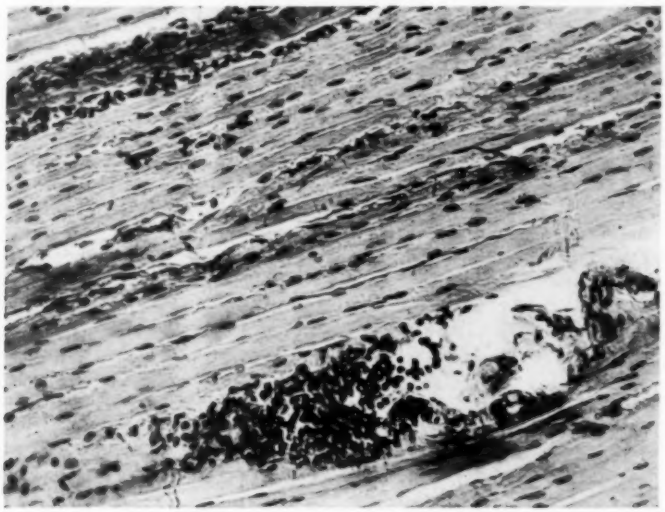

Fig. 1.—Case 4. (×96.)

CASE 5.—E. R. (H.L.H. A1890), a white male born June 8, 1926, had a family history of asthma and hay fever (mother). Birth, neonatal period, and development were normal; he was breast-fed nine months. The dietary regimen was adequate. He had mumps at 5 years of age, tonsillectomy and adenoidectomy at 6 because of frequent colds, and measles and otitis media at 7. He was immunized against smallpox and diphtheria.

In October, 1936, profuse head sweating was noticed. About a month later the skin about the child's eyes became reddened, followed by reddening over the bony prominences. Tetanus antitoxin was administered in December, 1936, because of an injury. The patient complained for months thereafter of pain at the site of injection. Eyelids, hands, and feet became puffy. The child grew weaker, tired easily, and lost appetite. Foul breath was noticed; abdominal pain and nausea followed meals, and a slight fever persisted. Contractures developed at the elbows. Various medications were ineffective.

The patient was admitted to the Harriet Lane Home on April 26, 1937. Admission findings were: temperature, 37.6° C.; pulse, 114; respirations, 14. General development was satisfactory. Eyelids, ears, and bridge of the nose were red and puffy. Erythema showed over the bony prominences and in scattered patches. The

heart was not enlarged, but showed a precordial systolic murmur and tachycardia. Blood pressure was 110/72. The lungs were clear, and the abdominal findings were negative. There was flexion deformity at the elbows, and limited motion at the wrists, hips, knees, ankles, and spine. The child changed from recumbent to sitting posture with great difficulty; he could walk a few steps, if helped to his feet.

Laboratory data were: hemoglobin, 78 per cent; red blood count, 4,600,000; white blood count, 7,440; polymorphonuclear cells, 61 per cent; small lymphocytes and large lymphocytes, 28 per cent; monocytes, 5 per cent; eosinophiles, 3 per cent; blood nonprotein nitrogen, 38 mg. per cent; inorganic serum phosphorus, 5.2 mg. per cent; serum calcium, 9.6 mg. per cent. Results of phenolsulphonephthalein and creatinine excretion studies were within normal limits. Teleoroentgenograms of the chest showed the heart size to be normal and the lungs clear. The electrocardiogram was normal, and the nasopharyngoscopic examination, negative. Intradermal tests with numerous antigens gave no significant allergic reactions. Biopsy from the right brachioradialis muscle revealed "distinct myositis, especially surrounding many of the small capillaries, where there are increased numbers of lymphocytes. These in some small areas seem actually to separate muscle bundles. Except in two small areas no muscle destruction was seen, but here the sarcolemma membrane is intact while the space formerly occupied by muscle fibers is now occupied by a thin, fibrillary, pink-staining material." (Fig. 2.)

Fig. 2.—Case 5. (×96.)

Capillary microscopy showed changes considered characteristic of scleroderma: that is, the capillaries at the nail bases and knuckles were greatly reduced in number and most of those present were exceedingly large and irregular.

The patient returned to his home in Norfolk, Va., May 7, 1937, but on September 15, he was readmitted to the Harriet Lane Home. In the four-month interval he had become worse. Nutrition was very poor, skin unimproved, muscles were more wasted, and contractures more marked. Hemoglobin had dropped to 62 per cent, red cells to 3,850,000; the white cell count was normal, except for 5 per cent eosinophiles. The appearance of superficial capillaries was unchanged.

Physiotherapy seemed to bring slight improvement, until in December, 1937, infection set in following accidental bruising of a finger. The injury itself was trivial. Local infection was followed by lymphangitis and adenitis. Beta hemolytic streptococcus was the causative agent. Sulfanilamide was administered, but was discontinued because of intractable vomiting. The infection progressed to a cellulitis, and the patient was desperately ill for several weeks. Diarrhea set in and was proved to be due to amebic dysentery. This was successfully treated. Streptococcic abscesses which formed frequently about the arms and shoulders left chronic ulcers which eventually healed. Severe anemia developed and did not respond to transfusions. The child was very homesick and refused to eat, so it was thought best to allow him to go home. He left the hospital Dec. 10, 1938. He died at his home Jan. 22, 1939, two years and three months after the beginning of the present illness. Autopsy was not obtained.

DISCUSSION

A striking feature in this small group of cases is the frequency of occurrence of calcinosis universalis in four of five cases. This incidence is entirely out of proportion to that in the literature. Rudolph, in 1934, reported a case of dermatomyositis complicated by calcinosis universalis and gathered several similar ones from the literature. The latter cases had all been differently diagnosed, usually as generalized scleroderma. The relationship of the scleroderma to dermatomyositis will bear discussion.

Langmead[19] considered generalized scleroderma, calcinosis universalis, and dermatomyositis as manifestations of the same underlying disease process. Allen,[20] Rothstein and Welt,[13] Rudolph,[12] and, recently, Dowling and Griffiths[21] have expressed the opinion that generalized scleroderma and dermatomyositis are probably identical. Brock[22] has attempted to differentiate these two. Scleroderma has been regarded as an entity much longer than has dermatomyositis. It occurs in generalized and localized forms. The localized forms, of several varieties, are not accompanied by marked constitutional symptoms and are probably unrelated to the generalized forms. Thiebierge,[23] in 1890, reported the occurrence of myositis in cases of generalized scleroderma. Crocker's[24] description of that disease, in 1903, is quite applicable to dermatomyositis. He states that generalized scleroderma is unrelated to the localized forms. The early skin manifestations are described as being of two types, brawny cutaneous edema and erythema with induration, the latter having the worse prognosis. Crocker stresses constitutional symptoms, myositis, and contractures. He mentions the occurrence of subcutaneous nodules, but does not state that they contain calcium. In 1907, Nixon[25] stated that myositis was regularly present in scleroderma. The same year, Dietsky[26] reported a case of generalized scleroderma with myositis and calcium deposits in soft tissues. Thiebierge and Weissenbach,[27] in 1911, reported a series of cases of generalized scleroderma with calcinosis universalis, both with and without muscle damage. The term Thiebierge-Weissenbach syndrome arose from that

report. Rake[28] (1931) found, at autopsy, lesions in the voluntary muscle of a patient with scleroderma and Raynaud's disease. This is of some importance because the case was of a type, not extremely uncommon, which differs clinically from dermatomyositis. These patients have severe, progressive skin manifestations, a sensitivity to cold indistinguishable from that in Raynaud's disease, and, frequently, atrophic changes in the phalanges known as sclerodactylia. They have little or no fever, and weakness is not a prominent feature. Dowling and Griffiths[21] claim to have observed patients demonstrating stages intermediate between the sort just outlined and typical dermatomyositis. They believe that all are fundamentally the same disease. These authors would also link dermatomyositis with myasthenia gravis and Graves' disease.

It seems evident that many cases reported as generalized scleroderma are indistinguishable from dermatomyositis. There is suggestive evidence that others, which differ considerably clinically, may be variations of the same disease process.

Most investigators have considered scleroderma of endocrine or vasomotor, rather than of infectious, origin. Abnormalities of the thyroid[18] and parathyroid[29, 30] glands are frequently mentioned as causes, but without proof. So far as the parathyroids are concerned, the only evidence is the presence of abnormal amounts of calcium in the diseased tissues in some cases. Deposits of calcium phosphate in tissues occur, however, in many conditions in which the parathyroids are normal. Lesions of the thyroid have often been found, but are not constant and vary in type; both hypo- and hyperthyroid states are reported.

The extreme susceptibility of patients with dermatomyositis to pyogenic infections is a fact of great importance which has not been adequately recognized. It is illustrated by the complications which occurred in the cases herein reported: erysipelas twice, cellulitis, abscesses, suppurative myositis. Tissues injured by the primary disease seem to have little ability to throw off invading organisms. Poor local nutrition due to vascular changes as evidenced by the abnormal capillary pattern is, in all probability, responsible for the low resistance. As yet, there are not enough data on which to base an evaluation of the role of vascular changes in the pathogenesis of dermatomyositis. Indeed, the morphologic abnormalities demonstrable by biopsy and autopsy are strikingly meager when compared to the loss of function in this disease.

SUMMARY

Five cases of dermatomyositis encountered at the Harriet Lane Home have been described. There were two deaths and three recoveries.

Four cases were complicated by calcinosis universalis.

Two patients had intercurrent attacks of erysipelas; another had streptococcic cellulitis. They recovered from these complications. Suppurative myositis was the cause of one death.

Muscle involvement was widespread and severe in each instance. Skin manifestations varied. Gingivitis occurred in three cases.

Hematologic findings were essentially normal, except for eosinophilia of varying degree in three cases and severe anemia in one.

There is no specific treatment for dermatomyositis. Efforts should be directed toward maintenance of nutrition, protection from infection, and prevention of contractures. The death rate is high, but patients who are fortunate enough to survive overcome contractures and muscular weakness practically completely. Calcium deposits, in cases so involved, disappear in time by absorption, sloughing out, or both.

The danger of intercurrent pyogenic infection in this disease cannot be stressed too greatly. Apparently, minor trauma may be the opening wedge for serious or even fatal infection.

The relationship of dermatomyositis to generalized scleroderma has been discussed. The writer agrees with Langmead and others who feel that the underlying pathology is probably identical. There is no adequate proof that dermatomyositis is of infectious origin.

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SERUM REACTION COMPLICATED BY ACUTE CARDITIS

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THE case to be discussed in this report is that of a boy who developed acute carditis during a serum reaction which followed the administration of but 5 c.c. of horse serum. As far as we have been able to determine, there is no similar case on record.

W. T., Jr., a white boy, 11 years old, was in good health until the evening of July 6, 1939, when he lacerated his left leg while washing a car. He was brought to the hospital where the laceration was cleansed, débrided, and sutured, and combined tetanus and gas bacillus antitoxin was given. The past history was negative except for tonsillectomy at the age of 5 years. There was no previous history of tonsillitis, rheumatic fever, growing pains, or heart trouble. He had had chicken pox, measles, and whooping cough at the age of 4 years; smallpox vaccination at the age of 5 years; but no horse serum had ever been given him.

Physical examination revealed an essentially normal boy except for the wound on his left leg. Tonsils had been completely removed. The heart and lungs were normal. Temperature (rectal) was 99.4° F.; pulse, 96; and respirations, 20.

COURSE

On the day following admission to the hospital his temperature rose to 104° F. The eyelids were swollen. The heart was not enlarged, the apex being 8 cm. from midsternal line. There was a ticktock rhythm with a rate of 128. The leucocyte count was with 93 per cent polymorphonuclear cells, 6 per cent lymphocytes, and 1 per cent eosinophiles.

An erythematous finely maculopapular rash appeared over the entire body on the next day. The temperature remained elevated; on examination of the heart, a presystolic gallop and a rubbing quality in the first sound were heard at the apex, but there were no definite murmurs. The impression at this time was that he had an acute myocarditis. The urine was entirely negative. Throat cultures showed hemolytic staphylococci predominating with *M. catarrhalis* and streptococci but no *B. diphtheriae* present. Electrocardiogram showed a P-R interval of 0.16 with slurring and widening of the QRS complexes and a right ventricular preponderance.

On July 11 the temperature was still elevated, rising to 103.8° F. and administration of 60 grains of salicylates daily was started. The urine showed some granular casts and one plus albumin. The sedimentation rate was 19 with the volume of packed cells 40 per cent. The leucocyte count was 8,350 with 76 per cent polymorphonuclear cells, 17 per cent lymphocytes, 5 per cent eosinophiles, and 2 per cent immature cells.

The blood culture was negative. In the next few days the temperature subsided. On July 17, eleven days after admission, he was afebrile and felt well. The heart rate was 76. The first tone at the apex remained loud, harsh, and prolonged, and a split second sound was heard. There were no definite murmurs. The patient was sent home where he was to remain in bed and continue salicylate therapy.

He was again seen on August 7 in the outpatient department. There was no essential change at this time. He was instructed to continue bed rest at home.

From the Departments of Surgery and Medicine, Henry Ford Hospital.

The patient was next seen on Sept. 8, 1939. The temperature was 99.2° F.; pulse, 110; and respirations, 24. The blood pressure was 110. The relative cardiac dullness was 7.5 by 2.5 cm.

There was a protodiastolic gallop with a diastolic rumble at the apex. A rubbing sound like an old friction rub was heard over the entire precordium. There was a tinge of cyanosis to the lips, but no ankle edema or liver enlargement. The impression at this time was that he had an active rheumatic carditis with a moderately damaged myocardium. The sedimentation rate was 10 mm. per hour, with volume of packed cells, 50 per cent. The electrocardiogram at this time showed a P-R interval of 20 with slurring and widening of the QRS complexes and right ventricular preponderance. He was advised to continue bed rest at home.

On Nov. 11, 1940, he was again seen. The temperature was 98.8° F.; pulse, 104; and respirations, 20. The gallop rhythm persisted, being easily heard over entire precordium. The diastolic rumble was not heard. There was no ankle edema or enlargement of liver. The electrocardiogram showed P-R interval of 18 mm. per hour, sinus tachycardia, right ventricular preponderance, normal Lead IV. The impression at this time was probable rheumatic fever with slowly subsiding carditis and early mitral lesion. Teleoroentgenogram showed no cardiac enlargement and normal contour. He was advised to remain in bed.

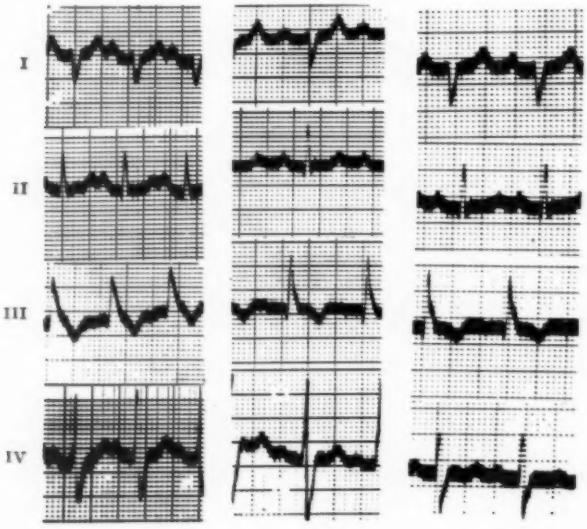

Fig. 1.—Electrocardiograms. *A*, July 8, 1939; *B*, Sept. 8, 1939; *C*, Nov. 10, 1939.

On Dec. 1, 1939, he was still in bed and was afebrile at this time. The sedimentation rate was 5, with volume of packed cells, 49 per cent. The blood count was normal. On Jan. 25, 1940, he was resuming activity gradually and was symptom free. Pulse rate was 84. The gallop rhythm was still present with a blowing systolic murmur at apex, transmitted to the axilla. P_2 was accentuated; there was no diastolic murmur.

Since there had been good progress on resumption of activity, and there was no cardiac enlargement, the boy was returned to school.

The electrocardiograms are shown in Fig. 1.

It has been demonstrated experimentally that reaction to foreign protein may produce changes in the myocardium. In 1915 Longcope,[7] experimenting with rabbits, found extensive areas of focal degeneration of the cells of the heart muscle as well as cells of the kidney and liver following repeated intoxicating injections of foreign proteins. In some cases he also found that interstitial myocarditis could be produced by a single injection of foreign protein. Boughton[3] in 1917 found that injections of foreign protein in sensitized guinea pigs produced lesions of the smaller arteries of the liver, kidney, spleen, and heart, characterized by degeneration and regeneration of the endothelium, edema of the intima and media, and sometimes by splitting of the internal elastic lamina. These early experiments have been substantiated by later experimenters who have found perivascular granulomas, areas of necrosis, cellular infiltration, and endothelial proliferation around the smaller coronary arteries. (For references see Clark and Kaplan.[5])

It would seem inconsistent that interstitial myocarditis could be produced in animals by serum reactions without a similar reaction occurring in man. Clark and Kaplan[5] report two cases of pneumonia in which administration of large quantities of serum was followed by severe serum reactions and later by myocarditis. Necropsy findings disclosed typical necrotizing arteritis and periarterial inflammation with a "proliferation of histiocytes in the mural and valvular endocardium, in the intima of the aorta and that of the pulmonary artery, and in the interstitial tissue of the myocardium, liver, kidneys, and adrenals—accompanied by focal edema of the surrounding tissue." The pathologic findings in these two cases were similar to those produced by anaphylaxis in animals and were interpreted by Clark and Kaplan as being caused by the severe serum sickness.

Clark[4] also reports the case of a 20-year-old patient who developed anterior poliomyelitis for which he was given 20 c.c. of concentrated horse serum intraspinally and 20 c.c. intramuscularly. Six days after the administration of the serum, he developed a serum reaction characterized by an erythematous rash, edema, and lymphadenopathy. Autopsy findings disclosed "diffuse infiltration of histiocytes in the subendocardial and connective tissues of the heart accompanied by focal infiltration between the muscle fibers."

Weill-Halle and Levy[10] report a case of a child who received 80 c.c. of antidiphtheria serum for a benign case of diphtheria. This was followed by a serum reaction (urticaria, joint symptoms), cardiac arrhythmia consisting of extrasystoles, and accentuation of the first sound. The child subsequently recovered without any further difficulty.

In the case dealt with in this report, the possibility that the child had asymptomatic, subclinical rheumatic fever, which was activated by the serum reaction, must be considered. Bland and Jones[1] in a review of 1200 cases of rheumatic fever found that, while 75 per cent of the cases of recurrences were preceded by upper respiratory infections,

nevertheless, there was a significant number of cases preceded by some other activating processes. They were impressed with the frequency with which the asymptomatic rheumatic disease was brought to the clinical level by nonspecific means such as protein shock. In ten cases with either low-grade, subclinical rheumatic fever, or recently quiescent rheumatic infection, typhoid-paratyphoid vaccine was given and resulted in reactivation of the rheumatic process. They observed recrudescence of the rheumatic process following a variety of other conditions such as a febrile reaction to the Schick test.

Swift[8] has called attention to the similarity of the sequence of events in rheumatic fever and in serum sickness. Book and Swift,[2] in comparing the exudates from the joints in the polyarthritis of each, found them indistinguishable. Swift[9] states that there does exist in rheumatic fever a state of allergic hyperirritability.

COMMENT

Evidence that serum reactions may produce carditis or may activate subclinical rheumatic carditis has been presented. Which of these factors played a role in this case would be difficult to decide. We may consider the two factors separately as they relate to this case.

1. If the assumption is made that the carditis was produced by the serum per se, it must be pointed out that the serum reaction which this patient had was not typical in several respects. The reaction appeared very early; the rash was maculopapular, but never urticarial; and there were no joint symptoms. Derick, Hitchcock, and Swift[6] state that the first skin reaction in serum disease is urticaria, but that in cases of relapse, the rash may be finely macular or maculopapular. They believe the urticarial skin reaction to be evidence of active immunization, but the maculopapular reaction of relapses and the joint symptoms, which appear late, to be evidence of passive immunization. The fact that there were no joint symptoms in this case may be explained by the fact that he received salicylates (60 grains daily beginning on the fourth day). Derick, Hitchcock, and Swift[6] found in their study that salicylates given early in the course of serum sickness would prevent the development of joint symptoms. The serum reaction in this patient was typical in that he did have fever, edema, a rash, and an eosinophilia.

Certain differences in this case and those of Clark and Kaplan[5] and that of Weill-Halle and Levy[10] are worthy of comment. First, their patients received large amounts of serum while this boy received only 5 c.c. Second, their cases were complicated by such diseases as pneumonia and diphtheria, while the patient under discussion was an apparently previously healthy boy.

It is worth noting that the serum reaction did affect his kidneys, although in a temporary manner, as evidenced by a transient albumin-

uria and some granular casts on one occasion. This reaction may very well have affected his myocardium to a greater extent, causing myocarditis.

2. There is much to favor the assumption that the carditis may have been reactivation of subclinical rheumatic fever by protein shock. There is considerable evidence that such reactivation may occur, as in the cited cases which followed typhoid-paratyphoid injections and Schick tests. There has been frequent comment on the similarity of serum disease and rheumatic fever, and that a hyperergic irritability exists in rheumatic fever is well known. With the allergic disturbance that a severe serum reaction produces, it is quite possible that a dormant rheumatic heart lesion may have been activated by this reaction.

If this view is accepted, we must assume that the child had previously existing unrecognized subclinical rheumatic fever. This is possible, as rheumatic fever is well known for just such insidious characteristics. Although the leucocyte counts and sedimentation rates during the acute stage in this case do not indicate rheumatic fever, the clinical course and heart findings since onset have been entirely compatible with rheumatic fever.

SUMMARY

A case in which there was a simultaneous onset of serum reaction and acute carditis is described. Two explanations of this are given. Whatever interpretation of the cause of the carditis is made, the striking fact is that this boy developed acute carditis following the administration of only 5 c.c. of horse serum.

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ERYTHROBLASTOSIS IN ICTERUS GRAVIS NEONATORUM SUCCESSFULLY TREATED WITH VITAMIN K

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THE diagnosis and decision to use vitamin K in the treatment of Case 2 described below was suggested in part by the clinical course and laboratory and post-mortem findings in a sister's case reported as Case 1. The deepening obstructive jaundice suggested a low blood prothrombin level, although a prothrombin clotting time was not done.

CASE REPORTS

CASE 1 (not treated by vitamin K) was a girl, born April 25, 1938, of normal parents who gave negative Wassermann reactions. The baby was their second child, the first being a boy then 3 years old who was normal in every respect. The girl was a full-term baby but was deeply jaundiced at birth. The vernix caseosa was very yellow; the amniotic fluid was dark, and the urine was dark, showing a positive test for bile pigment. The first stools were dark, and then the following ones became clay colored. The baby nursed and seemed to thrive for a few days, but the jaundice deepened. The liver was palpable three finger-breadths below the costal margin, and the spleen was palpable. The blood count on the fourth postnatal day was: hemoglobin, 43 per cent; red blood cells, 2,230,000, with a large number of nucleated red cells; white blood cells, 30,250; polymorphonuclear neutrophiles, 34 per cent, myelocytes, 5 per cent, and lymphocytes, 61 per cent. The bleeding time was 14+ and the coagulation time 7 minutes. There were ecchymotic areas over the body. The child became listless and died two weeks after birth. Whole blood was given intramuscularly after the fourth postnatal day.

Post-Mortem Examination.—The body was that of an infant girl about 2 weeks old, deeply jaundiced with several ecchymotic areas over the body. The lungs and pleura showed several hemorrhagic areas. There was no evidence of atelectasis grossly. The bronchi were patent and normal in appearance. The heart was normal in size and appearance. The liver filled the whole upper abdomen, and its capsule was tense and had an icteric tinge. There was no free bile in the gall bladder. The common duct was packed back up into the hepatic ducts with round hard thrombi. The spleen was of a dark brown color and weighed 35 Gm. The stomach, duodenum, and pancreas were normal in appearance; both kidneys were of normal size and appearance. The brain showed numerous petechial hemorrhagic areas.

The histologic examination, made by Dr. D. A. Wood, Stanford Hospital, San Francisco, showed the following:

Lungs.—The majority of the alveoli were normal, although a few contained a thin coagulated fluid.

Spleen.—The Malpighian bodies were indistinct. Numerous blood islands containing erythropoietic as well as myeloblastic elements were present. Pulp spaces were discrete and contained numerous normoblasts.

The erythrocytes varied considerably in size and shape. Many reticulo-endothelial cells were swollen. A few contained granular brown pigment.

Liver.—There were numerous small blood islands. Many of the von Kupffer cells were laden with brown granular pigment. The liver sinusoids contained only a few erythroblasts. In a number of areas the liver cells seemed to have disappeared. There was, however, no evidence in the section of a toxic necrosis.

CASE 2.—R. P. J., a brother of the patient in Case 1 and the third child in the family, was born June 18, 1939. He also was a full-term baby weighing 8 pounds 8½ ounces. The skin was jaundiced, the vernix caseosa was deeply yellow, and the amniotic fluid dark; otherwise, the infant seemed normal. The bleeding time taken twelve hours after birth was 8 minutes, and the coagulation time, 4 minutes. The blood count was: hemoglobin, 54 per cent; red blood cells, 2,230,000, with megaloblasts, 149 per cubic centimeter; white blood cells, 30,100; segmented polymorphonuclear neutrophiles, 20; staff, 34; metamyelocytes, 20; lymphocytes, 24; monocytes, 2. There was diffuse basophilia. The baby was given 10 c.c. whole blood intramuscularly twenty-four hours postnatally. He seemed listless, and the respirations were rapid; the stools and urine were dark. He nursed fairly well, but, in addition, he was given a post cibum lactose formula and water was forced. The jaundice deepened, however.

On the third postnatal day, the temperature varied between 100.8 and 103.8°, and despite a good intake of fluid and no vomiting, he lost 1 pound. The urine was very dark, and the stools were light in color.

On the fourth postnatal day, the jaundice was marked and the baby had some twitching spells. The temperature, however, was from 99 to 100.8° by rectum.

On the fifth postnatal day, ecchymotic spots appeared over the body and face. The stools were clay colored, the urine very dark, and the baby became very listless.

On the seventh postnatal day, the baby took his feedings indifferently. There was still no vomiting. The temperature remained normal, but the ecchymotic spots were larger. The bleeding time was more than one hour and the coagulation time 8 minutes. The liver was palpable three fingerbreadths below the costal margin and the spleen was palpable. The blood count was: hemoglobin, 40 per cent; red blood cells, 1,410,000, with many nucleated red blood cells; white blood cells, 31,250; polymorphonuclear neutrophiles, 63; lymphocytes, 33; eosinophiles, 3; monocytes, 1. Ten cubic centimeters of whole blood had been given intramuscularly daily.

On the ninth postnatal day, 4 c.c. of klotogen and 0.25 Gm. bilein in normal saline were given by gavage. Some of this was regurgitated after removal of the tube. The bile salts were included because of absence of bile in the digestive tract. All feedings were given by gavage. Twelve hours after giving vitamin K, the stools became very yellow; the urine also was yellow, staining the diapers. An additional 2 c.c. of klotogen was given in combination with the bile salts in normal saline by gavage twelve hours after the first dose. Several yellow stools were passed daily during the next two days. The urine was bright yellow, but the jaundice appeared the same. The baby was listless. The last dose of vitamin K and bile salts was repeated after another twelve hours. During the following week the baby aroused and began taking occasional feedings from the bottle.

By the eighteenth postnatal day, the jaundice was definitely less and the ecchymotic spots were receding. By the twenty-first day, the weight was 10 pounds 9½ ounces, the stools and urine were normal, and the baby was taking his feedings well. He was dismissed from the hospital on Aug. 5, 1939, the forty-seventh postnatal day. He seemed alert and playful, but the muscular movements were a little spastic.

Since then the baby has been seen several times. He was circumcised on Aug. 14, 1939, and the bleeding time then was 3 minutes and the coagulation time 2 minutes. In November, 1939, at 6 months of age, he contracted whooping cough and made an uneventful recovery. In January, 1940, at 8 months of age he was

brought in with a severe tracheobronchitis. In May, 1940, at 11 months of age, he had a streptococci throat infection.

At 7 months he weighed 17 pounds 14 ounces and was sitting up. At 1 year of age he weighs 28 pounds, stands and walks holding on to chairs or to someone's hand, and seems alert and interested in his surroundings. There is no evidence of spasticity.

It was my definite impression that administration of a large amount of vitamin K to this infant suffering with icterus gravis neonatorum with abnormal hemopoiesis increased or restored the blood prothrombin, so that the destruction of the blood cells was halted and the jaundice cleared with the decrease of prothrombin clotting time.

1409 H STREET

Erratum

In the article entitled "Intracutaneous Vaccination Against Smallpox by Means of the Chick Embryo Culture Virus," by Lewis Jacobs, M.D., New York, N. Y., and Harold Orris, M.D., Hillside, N. J., appearing in the November, 1940, issue of the JOURNAL, paragraph A, under Summary, page 638, should read:

"A. Of those initially vaccinated with 0.1 c.c. culture virus mixed with blood serum from previously vaccinated donors, there were 33.3 per cent primary takes, 50 per cent accelerated takes, and 16.7 per cent immune reactions."

American Academy of Pediatrics

Proceedings

NINTH ANNUAL MEETING OF THE AMERICAN ACADEMY OF PEDIATRICS

Nov. 16, 17, AND 18, 1939—CINCINNATI, OHIO

Round Table Discussion on the Newborn Period, Including Asphyxia

Chairman:	A. H. Parmelee, M.D., Oak Park, Ill.
Assistant Chairman:	W. C. C. Cole, M.D., Detroit, Mich.
Secretaries:	E. H. Baxter, M.D., Columbus, Ohio
	George R. Murphy, M.D., Elmira, N. Y.

CHAIRMAN PARMELEE.—The problems of the newborn infant are receiving the attention of an increasing number of clinicians and investigators in the various fields of science related to medicine. Maternal and child welfare organizations, as well as national, state, and municipal public health agencies, have focussed attention on this subject and have helped to make it one of the livest issues in medicine. Some of the results of this intensified interest are, in my opinion, particularly important and deserve to be reviewed by this group.

Asphyxia is one of the greatest hazards for the newborn infant, and, as would be predicted, it has been the subject of most intensive study in recent years. The results of these studies have been: (1) a clearer understanding of the factors influencing the respiratory center in the medulla; (2) a conception of fetal intrauterine respiratory movements, together with demonstrations of how they may be depressed or abolished experimental animals by various narcotic, analgesic, and anesthetic drugs and gases; (3) the influence of certain obstetric procedures on the incidence of asphyxia.

Anoxemia, general as well as local in certain vital areas, has an effect on the health and integrity of living tissues; the degree of its effect depends upon the severity of the anoxemia and the vulnerability of the tissues involved. Recent investigations clearly indicate that damage to the brain due to anoxemia may explain many of the transitory neurologic symptoms observed in the newborn infant, and probably some of the permanent brain injuries, the etiology of which has been a matter of dispute for so many years.

Atelectasis, which has always been a loosely applied term in respect to the newborn infant, has been carefully investigated. As a result we can now rightfully insist that the cause or causes of this condition should be included as an integral part of such a diagnosis. These investigations throw new light on the pneumonias of the newborn infant and serve to explain cyanotic states encountered in many instances.

Shock.—The conception that practically all newborn infants suffer from shock of varying degree is relatively new and has much evidence in its favor. If it is true, we will have to change some of our ideas about phenomena we have been in the habit of calling physiologic.

Prematurity and *immaturity* have always been the greatest factor in keeping our neonatal mortality rate at its persistently high level. The problem has to do not only with improving the care of these infants, but much more with how to reduce the degree of their immaturity at the time of their birth, i.e., how to prolong the pregnancy, and with determining the safest way to deliver them. These considerations have been gone into quite thoroughly, and methods have been devised by which the size and weight, and thus the probable state of maturity, can be quite accurately estimated before pregnancy is interrupted.

All of these studies have helped to bring about a realization that the problem of the newborn infant is as much one of obstetric as pediatric concern. The most significant advance in regard to the newborn infant, in my opinion, is the increasing cooperation between the obstetricians and the pediatricians in a combined effort to find ways and means of reducing neonatal mortality.

There is still another approach to the subject from a direction which is now inadequately used. I refer to post-mortem examinations of stillborn infants and infants dying during the newborn period. The value of information obtained by qualified pediatric pathologists trained in the peculiarities of the newborn infant cannot be overestimated. There have been a few such studies on relatively large numbers of infants and these have been most enlightening. But these studies have been pitifully few in view of the large amount of material available. There is a sad need for pathologists capable of doing and willing to do careful and accurate autopsies on newborn infants.

The subjects I have touched upon will serve as a basis for our questions and discussions later. The effects produced by anoxemia and the factors influencing its occurrence have been carefully studied by Cole, Schreiber, and others. The results of these studies are of value not only as they relate to the problem of asphyxia, but also from the standpoint of the relationship to serious permanent brain damage.

Dr. Cole is going to tell us now of some of the results of these studies.

ASSISTANT CHAIRMAN COLE.—Asphyxia of the newborn infant is usually defined in textbooks on pediatrics as an absence of, or interference with, breathing in the newly born infant. This is not an accurate definition because, strictly speaking, asphyxia is a diminution in the amount of available oxygen in the circulatory blood and is not necessarily associated with the movements of respiration. Typical examples of this are carbon monoxide poisoning, barbiturate poisoning, and simple drowning.

Moreover, the classification of asphyxia as usually given is inadequate. The old standard classification is asphyxia livida and asphyxia pallida. This merely expresses differences in degree of asphyxia and tells us nothing as to its etiology and gives only a limited clue to its treatment or prognosis. Then again, asphyxias are sometimes classified as those of intrauterine origin and those of extrauterine origin. This is open to the same objection, that it tells us little about etiology or treatment. It makes but little difference to the baby whether he is asphyxiated before or after delivery.

A much better way to classify asphyxia is asphyxia of central origin and asphyxia of peripheral origin. By asphyxia of peripheral origin we mean asphyxia resulting from interference with the entrance of oxygen into the fetal circulation. This may occur in utero from such conditions as premature separation of the placenta or interference with the circulation of the umbilical cord, or it may occur after birth from such conditions as simple strangulation, obstruction to the air passage by blood or other foreign material, or from atelectasis.

By asphyxia of central origin we mean asphyxia resulting from some interference with the function of the respiratory center. This may be due to gross injury to the brain, as occurs in hemorrhage, edema, or lacerations; it may be due to the circulatory changes associated with the phenomena of shock; or it may be due to

the effect of toxins, anesthetics, and analgesics which reach the baby through the maternal circulation. This method of classification not only gives us a more definite idea of the cause of the asphyxia, but also gives us strong indications for its prevention and treatment.

We have never paid much attention to asphyxia until the past few years. As long as the baby ultimately breathed, we were reasonably well satisfied, but two important developments in our fundamental knowledge in the last four or five years have placed an entirely new significance upon the asphyxiated baby.

The first of these is an entirely new conception of the inauguration of respiration. It was formerly thought that the newborn baby was born in a state of physiologic apnea, and that as the placental circulation ceased to function, the accumulation of carbon dioxide in the baby's blood stimulated the respiratory center and caused respiration to begin. The remarkable studies of Snyder and Rosenfeld have caused us to discard entirely this theory. They have shown beyond the question of much doubt that respiration is not a function which starts abruptly at the time of birth any more than any other vital function, but that the movements of respiration occur in regular rhythm during the latter third of intrauterine life. Moreover, they have shown that once these movements are established, they are continuous and not interrupted unless some profound influence is exerted on the fetus. If this conception is correct, it means that the normal infant should take its first extrauterine breath within a very few seconds after it is born. This puts an entirely different significance upon the baby who is not breathing at birth. It means that such a baby has been profoundly affected by something, whether it be strangulation, anesthesia, narcosis, or shock from the trauma of labor.

Of even more importance, however, than this changed conception of the inauguration of respiration has been the demonstration of the serious and frequently devastating changes produced in the cells of the central nervous system by relatively short periods of anoxia. The first important work on this subject was published by Yant and his coworkers in 1934. They were able to show experimentally that the cells of the central nervous system are much more sensitive to oxygen want than are the other cells of the body and that as short a period as one minute of complete lack of oxygen was frequently sufficient to cause their death. Courville has duplicated these studies experimentally with nitrous oxide anesthesia and has successfully demonstrated the same type of lesion in babies dying from asphyxia. Hartman has carried these studies further and has also demonstrated the same type of "devastation necrosis" in the central nervous system from several other types of anoxia, notably hyperpyrexia, acute alcoholism, and barbiturate poisoning. Our attention has been particularly called to the importance of this question by Dr. Schreiber. Schreiber is a neurologic surgeon, and in the course of his practice he was impressed by the large number of older children who were brought to him with various types of degenerative brain disease in whom he uniformly found a history of severe asphyxia at birth. He has now collected over 900 such cases in which no other etiological factor is discoverable. He stresses particularly the role of analgesics and anesthetics administered to the mother in their relationship to asphyxia. Dr. Schreiber has kindly loaned me a few of his slides which I would like to show at this time. [A demonstration followed of lesions produced in the central nervous system by anoxia.]

What does this means? If these serious and extensive lesions can be produced by severe degrees of asphyxia, is it not possible that milder degrees of asphyxia will produce less serious and extensive lesions? If so, it opens up a wide field of speculation as to the possible etiology of such conditions as epilepsy, psychopathic personality, and lesser degrees of mental inferiority.

Obviously we had plenty of asphyxiated babies long before analgesics or anesthetics were used in obstetrics. A large number of different factors may be re-

sponsible for asphyxia. We have recently completed an analysis of 5,000 consecutive deliveries at the Woman's Hospital in Detroit, with a view of determining the relative importance of these factors.

The details of this study are presented elsewhere, but briefly we may say certain things. The most important single factor in producing asphyxia is premature birth and immaturity of the fetus. The next most important factor is apparently the shock resulting from the trauma of labor, whether that be the result of normal labor or labor complicated by dystocia and operative delivery. But it is also evident that sedatives and anesthestics administered to the mother during labor increase the incidence of asphyxia in the infant in direct proportion to the amounts given. It is impossible to give a drug or general anesthetic to a mother without also giving it to her baby. All known sedatives and general anesthetics are respiratory depressants. The baby is usually much more sensitive to the effects of these agents than is the mother and suffers at least as much or more effect from their administration than she does. It is therefore impossible to give any of these things during labor without increasing the incidence of asphyxia with its potential serious consequences.

CHAIRMAN PARMELEE.—The rate of cerebral blood flow has been shown to be an important factor in maintaining the functional integrity of the respiratory center. The cardiovascular system thus assumes an important role, with emphasis, probably, upon the peripheral vascular mechanism. This is a vulnerable point because the vasomotor mechanism of the newborn infant is immature and unstable even when the infant is born at term, and much more so when birth has been premature. This is illustrated by a phenomenon that can be demonstrated in some of the smaller premature infants: If the infant is placed on his side, the lowermost half of the body will in a short time become flushed, while the uppermost half will become blanched; the flushed half is sharply demarcated from the blanched half as if by a line extending exactly down the middle of the forehead, nose, lips, chin, sternum, and abdomen to the symphysis pubis, and on the back, down the center of the spinous processes of the vertebrae. This would seem to indicate that in its immature state the paired sympathetic nervous system is not working as a unit, but rather the two halves are functioning independently, perhaps due to inadequacy of the connection which normally exists in the corpus striatum.

This illustration is given for the purpose of calling attention to the probability that full-term as well as premature infants have at birth an unstable autonomic nervous system. Changes in the peripheral vascular system therefore can be rather easily produced by various traumatic insults, particularly when applied to the head, and also by chemical agents such as drugs and gases.

These ideas help in the understanding of the conception that most, if not all, newborn infants suffer from some degree of shock. I am now going to call upon Dr. Cole again to tell us what he thinks about the role of shock as it affects the ability of the newborn infant to adjust himself to his extrauterine environment.

ASSISTANT CHAIRMAN COLE.—The conception that the "normal" newborn infant may be in a state of mild shock is relatively new. If such a conception proves to be correct, it should greatly modify not only our routine care of newborn babies, but many obstetrical procedures as well.

Practically all laymen and most physicians think of labor from the mother's point of view. The baby usually receives scant attention until the process is over. Many procedures have been advanced in recent years to make labor easier for the mother, but very few have been suggested to make delivery safer for the child. After all, the function of labor is to produce healthy children. True progress in obstetrics should certainly be as much concerned with insuring the baby's safe passage through the birth canal as with making labor more endurable for the mother.

A most casual inspection of newborn statistics should be sufficient to convince anyone that this is not an insignificant problem. In hospital practice, about 4 per cent of the newborn babies are either stillborn or die in the first week of life. More than half of these deaths are due to accidents of labor, especially cerebral injury and asphyxia. It is estimated that about 70,000 recognized cases of cerebral hemorrhage in the newborn infant occur in the United States each year. A very large proportion of the inmates of public institutions for the mentally or physically handicapped are cases resulting from birth injury. Therefore, it seems appropriate that we gather data which may throw additional light upon the factors responsible for these injuries.

Labor in the human being is quite a different problem from that in even the largest of the mammals because of the large size of the infant's head and the disproportion between it and the mother's pelvis. It has been suggested that the amount of trauma to the head which is necessary under even the most ideal conditions is sufficient to produce a considerable degree of shock in the infant. Changes in blood pressure, blood volume, and blood flow in newborn babies, similar to those found in patients with surgical shock, have been reported. Clinical evidence of this shock is the apathy, refusal of food, and marked loss of body weight almost invariably observed during the first days of life.

The loss of weight has always been called "the physiologic weight loss of the newborn infant." It has been explained by the loss of meconium and urine from the body, by the vomiting of mucus, and by the fact that the baby usually receives little or no food or fluid during the first days of life.

If we examine the growth curve of the ovum from the time of fertilization until birth, we will observe that it is rapid and continuous. Also, if we examine the growth curve of the infant after it has recovered from the effect of birth, it is again rapid and continuous. It does not seem reasonable that such a marked interruption of development, sometimes involving a loss of 10 per cent of the body weight, can be a "physiologic" phenomenon. Furthermore, if the various factors usually listed as accounting for this loss of weight are all added together, they are sufficient to explain only a part of the weight lost by most babies. Apparently some changes must occur which have not been considered previously.

One of the outstanding features of shock is a disturbance in the water metabolism, involving the loss of large amounts of water from the body, chiefly through the skin and lungs. The work of Coller on the water metabolism of patients after operation has demonstrated this thoroughly. While similar studies have not been made on newborn infants, the analogy between them and adults after operation seems sufficiently close to assume that similar processes are taking place. If this be true, the weight lost by the newborn infant is largely due to water lost from the body and should be more or less an index to the degree of shock.

In the observation of large numbers of newborn infants, we have been impressed by the fact that babies of similar size, apparently born under similar conditions, and fed and cared for in like manner, vary widely in the amounts of weight which they lose. Some factors obviously must be operative in one case which are not present in the other. If birth shock is a factor in some of these cases, conditions during and after labor which might tend to increase the birth trauma should be possible of detection by an inspection of the delivery record.

With this in mind, we have collected a considerable series of cases in which accurate observations of many of the possible factors which might involve the baby were carefully recorded and tabulated.

[There followed a presentation of charts in which the following points were brought out:]

1. The average weight loss for the whole group was exactly 5 per cent, considerably less than the figures usually given, probably because of the routine early administration of fluids.

2. There is no difference in the initial loss between the babies of primiparae and those of multiparae, but the latter recover more quickly, probably because of the earlier appearance of the milk.

3. All types of operative delivery in which the head is not the presenting part result in much smaller weight losses, apparently because of reduced trauma to the baby's head. Babies delivered by low forceps lost less weight for the same reason. All other groups lost more weight.

4. Long, slow labors resulted in decreased weight loss, apparently because of the gradual and less violent progress of the child through the birth canal.

5. Babies whose mothers received pituitrin recovered their birth weight much more slowly.

6. When mothers received barbiturates, the babies lost considerably less weight, either because these drugs tend to retard labor or because their effect upon the baby helps him to withstand shock. When mothers received scopolamine, the babies lost considerably more weight, apparently because labor is not retarded and both mother and baby are rendered hypertonic and irritable.

7. Weight loss in the baby was reduced in direct proportion to the amount of ether administered to the mother, for several possible reasons—the slowing down of the second stage of labor, the sedative effect upon the child, the reduced water loss from the baby's lungs.

8. Loss in weight and drop in body temperature were in direct proportion, which probably indicates the fall in temperature is merely another characteristic of shock.

9. The time of tying the umbilical cord bears a direct relationship to loss in weight in the baby, because of its influence on blood volume. The sooner the cord was tied, the more weight the baby lost.

These studies seem to show conclusively that the weight lost by newborn babies during the first days of life is not entirely physiologic, but is due at least in part to water lost from the body as a result of "shock." Factors contributing to increased shock are especially increased head trauma, early tying of the umbilical cord, and the administration of scopolamine to the mother. Factors tending to decrease shock are reduced head trauma, administration of barbiturates and ether to the mother, and late tying of the umbilical cord.

DR. J. V. GREENEBAUM, CINCINNATI.—This discussion has been important because of its emphasis on the prevention of disturbances of the newborn infant. To me, there are four significant factors involved in or methods to be employed for the same purpose. Resuscitation of the newborn infant is satisfactorily accomplished by the use of 5 per cent carbon dioxide in oxygen. I should like to have Dr. Cole discuss the best methods of resuscitation, particularly in the premature infant in which the cyanosis may be due to weakness and immaturity of function. For the cyanosis of the premature infant, often present during or after feeding, the use of pure oxygen for a few minutes before or after each feeding is valuable. Routine x-ray examination of the chest in the newborn infant will reveal some causes of cyanosis. Occasionally there is found a slight unilateral pneumothorax as a cause. When due to a ruptured alveolus, with resulting ball-valve effect, the pneumothorax may become progressive, with increasing cyanosis. Pure oxygen is to be preferred in the type of atelectasis due to immaturity of respiratory function or in primarily physiologic cases.

Finally, should vitamin K be given routinely to all newborn infants or only as indicated?

ASSISTANT CHAIRMAN COLE.—Resuscitation of the newborn infant remains a problem of the obstetrician since the pediatrician is rarely present at the time of delivery. It is to be remembered that the cyanotic infant is in shock and ordinary methods of resuscitation only intensify this. These methods may

be quite violent, as in the use of "jackknifing," swinging, spanking, forceful dilatation of the sphincters, hot and cold baths, and dropping ether on the chest and abdomen.

Three factors are involved in treating the cyanotic newborn infant. First, the infant must be kept warm. The external temperature is likely to be from 80 to 90°, in contrast to the accustomed intrauterine temperature of 100°. External heat should be used but judiciously and under supervision. To this end, the immersion bath may be satisfactory. Second, the air passages must be cleared so air may pass into the lungs. Gentle removal of mucus from the mouth and pharynx by gauze and by gravity will usually suffice. Aspiration through a tracheal catheter by an experienced worker is usually simple. Third, air and oxygen must be forced into the lungs, since, in some instances, the infant is too weak to raise the chest wall for the first breath. Mouth-to-mouth breathing may be used, although there is danger of infection as well as the use of too much pressure, resulting in the possible rupture or dilatation of a bronchus or alveolus. The Drinker respirators so much publicized and popularized at present are probably of little value. The establishment of the rhythm is difficult. The problem of using pure oxygen is not definitely settled. It seems that in cases of mild anoxemia the mixture is of more value, whereas in the severely anoxic states the mixture aggravates the cyanosis and should be replaced with pure oxygen.

CHAIRMAN PARMELEE.—I agree with Dr. Cole in regard to resuscitation and the fact that although the most urgent need of the shocked infant is oxygen, mixtures of oxygen and carbon dioxide are still of value. Especially is this true in the "fatigue" of respiration which occurs later. The prolonged shock found in the premature infant, together with the characteristically decreased flow of blood, increases the need for more oxygen. This is also particularly true after feeding. In the Presbyterian Hospital in Chicago it is the custom to give pure oxygen for fifteen minutes every four hours or after feedings, or more often as needed.

Routine x-ray examination of the chest of the newborn infant would be enlightening; however, the uncertainty of a single plate would make serial plates more valuable. X-ray will not reveal the atelectasis known as physiologic atelectasis, nor any other form unless the cyanosis is moderately severe.

DR. D. O. WALTHALL, KANSAS CITY, MO.—What is your conception of atelectasis? Why should apparently normal babies show this?

ASSISTANT CHAIRMAN COLE.—It never occurs in the normal full-term infant. However, in the premature infant the lack of development is a factor in its occurrence.

DR. E. I. LESLIE, EVANSTON, ILL.—From some reports on vitamin A deficiency, the changes in the character of the epithelial cells may be a factor in producing atelectasis by plugging the alveoli.

CHAIRMAN PARMELEE.—Atelectasis occurs in full-term and premature infants as a secondary manifestation. It may be due to disturbances in the permeability of the alveoli. All infants have initial atelectasis. The secondary form occurs as a result of some disturbance in the central or peripheral respiratory mechanism.

Peterman, in a discussion of pneumothorax in 1,000 routine infants, found that 1 per cent showed pneumothorax in some degree, some cases of which were due to a ruptured air saccule, providing a free inlet to, but poor outlet from, the pleural cavity. This produces a constantly increasing pneumothorax, with progressive cyanosis and dyspnea, and may be sufficient to displace the heart.

DR. G. R. MURPHY, ELMIRA, N. Y.—What is the value of Vitamin K in cerebral trauma?

CHAIRMAN PARMELEE.—Vitamin K probably has some value in hemorrhagic disease but is not likely to be of value in birth trauma. Vitamin K has not been in use long enough to know its value in routine administration. One sees less hemorrhagic disease of the newborn infant than formerly. This may be due to the better feeding of the mother during pregnancy.

DR. NOAH MILLER, AKRON, OHIO.—Is the rupture of the peripheral air vesicle due to too vigorous resuscitation? What is the best technique for the routine administration of oxygen?

CHAIRMAN PARMELEE.—A funnel with the oxygen tank is as efficient as any method. The cellophane head tent is also satisfactory. Premature beds are equipped with attachments for the use of oxygen. In cases of dyspnea, the above methods are of little value since positive pressure is needed to force the oxygen into the lungs. In complete apnea, oxygen may be given slowly by the way of the stomach where it is absorbed rapidly and produces a quick change in the infant.

ASSISTANT CHAIRMAN COLE.—The consensus of opinion is that more damage is caused by the anoxemia than by hemorrhage. Dr. Joseph A. Johnston of Ford Hospital can use any percentage of carbon dioxide in oxygen, with varying effects. Pure oxygen, when prolonged, decreases the respiratory rate. If carbon dioxide is then used, the rate increases, only to fall when the carbon dioxide is continued. This fall is then relieved by using pure oxygen.

CHAIRMAN PARMELEE.—The question of when to use oxygen or carbon dioxide is not settled. The physiology of the respiratory center shows its chief need to be oxygen. However there may be a need for an increase in the stimulating material, in which case carbon dioxide is required.

Too much reliance cannot be placed on crying as an indication of hunger, since crying is only a reaction.

In larger obstetric centers, neonatal mortality might be reduced by the development of a project similar to the "tetanus team" of Cook County Hospital or to a blood transfusion team. This could be a "newborn life-saving team" consisting of an obstetric and a pediatric resident and a trained nursery nurse. All newborn infants would go to them at the time of delivery. By changing the personnel on a rotating basis, it would be self-perpetuating and result in the development of larger groups of trained "life-savers."

DR. F. B. SCHLEY, COLUMBUS, GA.—What percentage of newborn infants show asphyxia or are injured by the antepartum use of pituitrin?

ASSISTANT CHAIRMAN COLE.—An analysis of 5,000 deliveries showed that pituitrin is used only as a means of induction of labor and not in the second stages. This group showed a definite increase in asphyxia.

CHAIRMAN PARMELEE.—The incidence of intracranial birth hemorrhage was greater when labor was short and precipitate, such as that which might follow the use of pituitrin.

DR. WILLIAM WESTON, COLUMBIA, S. C.—How can anesthesia or analgesia be safe for the baby?

ASSISTANT CHAIRMAN COLE.—This is difficult to answer since it is impossible to give either to the mother without affecting the baby. In physiologic doses, they act as respiratory depressants. The worst results occur in complicated cases requiring deep prolonged analgesia or anesthesia.

DR. H. J. MORRISON, SAVANNAH, GA.—The role of the thymus in the production of cyanosis has not been interpreted in this discussion. A drop in the infant's temperature due to exposure may be fraught with danger. This might occur as a

result of exposure during the x-ray technique. May I ask Dr. Cole if any obstetric analgesics or anesthetics are considered safe?

ASSISTANT CHAIRMAN COLE.—No analgesic or anesthetic is known that does not affect the baby. All of them are respiratory depressants. I have never seen cyanosis due to an enlarged thymus, although infants are treated for it.

DR. S. A. ANDERSON, JR., RICHMOND.—Will you discuss the use of respiratory stimulants and recurrent cyanotic attacks?

ASSISTANT CHAIRMAN COLE.—All respiratory stimulants are followed by depression. Their use probably makes no difference in the outcome of the case. Treatment during the first days of life calls for oxygen until the babies are well established. The question of oxygen alone or with carbon dioxide is of interest. Eastman at Johns Hopkins showed a reversal of sensitivity of the respiratory center. This shows carbon dioxide may depress rather than stimulate in severe cases. Because of this, oxygen is the choice except in mild cases.

CHAIRMAN PARMELEE.—Personally, I believe that oxygen is the crying need in all cases. Some cases of mild asphyxia may be helped by carbon dioxide and oxygen. The respiratory center must function normally to respond to carbon dioxide stimulation. This requires the presence of oxygen. In the presence of anoxemia, normal response is lacking and carbon dioxide does definite harm. Premature babies require continuous or intermittent use of oxygen over many days to prevent recurrence of anoxemia. The oxygen may be used continuously or for ten minutes every one or two hours.

DR. E. L. GLASSCOCK, KANSAS CITY, MO.—What is the importance of the thymus gland in the newborn infant?

CHAIRMAN PARMELEE.—I have never seen an infant suffering from enlargement of the thymus in the newborn period. I have seen x-rays that indicated thymic hypertrophy without symptoms. I also have seen babies with symptoms after the newborn period which might be due to thymus. X-rays taken in different phases of respiration change the appearance of the shadow. Probably x-ray treatment would do no harm in certain cases.

DR. MURPHY.—Are we justified in saying that x-ray does no harm? I have seen two children at 6 and 8 months of age, respectively, who weighed no more than at birth and who had had several treatment for a suspected hypertrophied thymus. In view of Rowntree's work on the relation of the thymus to growth, it seems we should utter a word of caution.

CHAIRMAN PARMELEE.—Proper x-ray treatment probably will do no harm, but eight to ten treatments surely would be dangerous.

ASSISTANT CHAIRMAN COLE.—I saw a case of overtreatment of a suspected enlargement of the thymus, in which the real difficulty was congenital laryngeal stridor. At autopsy, it was shown that the x-ray had caused a mild myocarditis. I think we should stop talking about this very rare condition.

DR. E. G. SCHWARZ, FORT WORTH.—What is the value of the respirator?

ASSISTANT CHARMAN COLE.—The Drinker respirator may be of value in inducing the first inspiration when the infant is too weak to raise the chest wall against normal atmospheric pressure, but it is of no value after that.

DR. G. C. MALLEY, ZANESVILLE, OHIO.—There has been much publicity given the use of the Drinker respirator for resuscitation of these infants. It seems that

those living after being subjected to it would not die away. Will Dr. Cole explain the procedure in using the tracheal catheter?

ASSISTANT CHAIRMAN COLE.—I have never passed a tracheal catheter; however, the obstetric resident is able to use it successfully, either with or without a laryngeal mirror.

DR. J. G. KRAMER, AKRON, OHIO.—In contrast to the Drinker type of respirator, the General Tire and Rubber Company is developing one consisting of a shell fitting the anterior surface of the trunk. By means of a motor, pressure within the shell is lowered, thereby raising the chest and abdominal wall.

What is the significance of edema in the newborn infant?

DR. E. H. BAXTER, COLUMBUS, O.—The apparatus mentioned by Dr. Kramer is the same as the Eisenmenger Shell which has been used in Vienna for four or five years and has been found quite satisfactory in place of the clumsy respirators.

CHAIRMAN PARMELEE.—A discussion of edema of the newborn infant is too great for this time. The newborn infant is hydrolabile, which means it is easily subject to the extremes of dehydration or "water logging." The latter may be edema, especially of the dependent parts. The problem of edema is intimately associated with a poor vasomotor balance or with some unknown cellular function. Very little is known about the metabolism of the fetus.

DR. A. B. HOYER, CINCINNATI.—What effect does the lack of vitamin B have in the production of edema of the newborn infant?

CHAIRMAN PARMELEE.—I am not familiar with the role of vitamin B in the production of edema. It is certain there has been no decrease in the incidence of edema since the extensive administration of vitamin B to the mothers.

DR. T. L. BIRNBERG, ST. PAUL.—Will you discuss cerebral hemorrhage and cerebral injuries?

CHAIRMAN PARMELEE.—These do occur, but probably not as often as was formerly thought. Premature infants are especially prone to develop hemorrhage. I am not sure that an encephalogram at two years will prove that atrophy is due to anoxemia or cerebral agenesis. It may be the late effects of damage caused by hemorrhage.

The picture of intracranial hemorrhage is a bizarre one, with protean manifestations. No matter what other symptoms are present, there is either somnolence or motor irritability.

DR. R. E. JENNINGS, EAST ORANGE, N. J.—We have found that the Drinker respirator makes an efficient incubator. Will Dr. Parmelee discuss the treatment of intracranial hemorrhage?

CHAIRMAN PARMELEE.—I have several ideas what not to do for intracranial hemorrhage. It is essential to leave the infant alone as much as possible, with a minimum of manipulation. I hold no brief for the use of blood, but I am afraid not to use it. Its only value is to stop recurrent hemorrhage by decreasing the coagulation time in hemorrhagic disease of the newborn infant. The damage has already been done. It is likely that there has been too much meddlesome treatment, such as spinal and cisternal punctures. These are of limited diagnostic and therapeutic value, giving temporary relief in cases of repeated convulsions and a bulging fontanel, and satisfying the diagnostic curiosity of the physician, without any value to the infant. Spinal puncture is not necessary to make the diagnosis;

cisternal puncture is not safe except in the hands of experts. I use them infrequently for either diagnosis or treatment.

DR. JENNINGS.—What is the relation of the blood sugar to spinal fluid sugar in the newborn infant?

CHAIRMAN PARMELEE.—The blood sugar of the newborn infant is lower, and the spinal fluid sugar is lower than the blood sugar.

DR. A. L. NEWCOMB, CHICAGO.—About five years ago Priscilla White reported that babies born of diabetic mothers should receive glucose, but gave no figures for the blood sugar.

CHAIRMAN PARMELEE.—Do you know the number in Priscilla White's clinic with low blood sugar?

DR. NEWCOMB.—About 20 per cent.

CHAIRMAN PARMELEE.—There may be a blood sugar of 30 without any hypoglycemic shock.

DR. BIRNBERG.—What is the significance of tetany neonatorum? I have not felt justified in attaching too much importance to it.

CHAIRMAN PARMELEE.—I have seen a few cases which might have been hypocalcemic tetany. This condition has received too much attention for its frequency. The burden of proof rests on those making the diagnosis. Intracranial trauma is more often the cause of these twitchings. Hypoglycemia is a more frequent cause of trouble than hypocalcemia. Since the days of insulin, pregnant diabetic women have babies who present the problem of insulin shock.

ASSISTANT CHAIRMAN COLE.—Recent investigations of convulsions in newborn infants show only one case that might be due to hypocalcemia. None of these levels was below 8 mg.

DR. B. B. BREESE, ROCHESTER, N. Y.—I have seen ten cases of tetany in the first month of life. The diagnosis was based on clinical findings and a blood calcium level below 8 mg. Usually the mothers had vomited a great deal in the latter part of pregnancy or were toxic. I believe this is the most common cause of convulsions in the newborn infant.

CHAIRMAN PARMELEE.—How did you prove these convulsions were not due to trauma? Can you assume a blood calcium level below 8 mg. to be the cause? Did you prove this by means of electrical tests?

DR. BREESE.—No.

CHAIRMAN PARMELEE.—Unless the blood calcium is extremely low these other etiological factors must be excluded. I am prejudiced against the diagnosis of tetany. Dr. Cole's slides show these complications may be due to cerebral anoxemia.

DR. HOYER.—What respiratory stimulants can be used? What is the value of hypertonic saline by mouth and Ringer's solution by rectum in cases of weight loss and hydrolability?

ASSISTANT CHAIRMAN COLE.—Coramine and alphalobelin are used extensively and seem to be effective early, but are of short duration. This may be followed by respiratory depression. Weight loss may be stopped by fluids, but this is of no great value.

CHAIRMAN PARMELEE.—I know of no one with experience in using hypertonic saline. It has been shown conclusively that the weight loss can be kept very low and the birth weight can be regained under twelve days. But of what value is it? It is surely of no harm unless it decreases the volume of breast feeding. Sanford has shown there may be some loss of breast feeding by early fluid and formula administration. It is necessary to watch the infant's weight curve and general condition and to be prepared to interfere if the physiologic weight loss tends to become pathologic.

DR. T. P. SALTIEL, CHICAGO.—If weight loss is a manifestation of shock, should it not be treated as such? What is the physiologic loss?

ASSISTANT CHAIRMAN COLE.—There is no harm in the infant's losing weight, although there is evidence to show the relation of shock and weight loss.

CHAIRMAN PARMELEE.—Dr. Cole has shown that weight loss is proportionate to the amount of shock, but the use of fluids will not change the original damage.

DR. B. P. STORTS, JR., TUCSON.—Would it not be best if the obstetrician waited for cessation of cord pulsation, in order to prevent shock?

CHAIRMAN PARMELEE.—This is very important.

DR. ANDERSON.—Would it be theoretically possible to use cortical hormone to combat shock?

CHAIRMAN PARMELEE.—It might be used, but it is too expensive.

DR. SALTIEL.—What is the attitude of obstetricians and surgeons regarding the use of analgesics?

ASSISTANT CHAIRMAN COLE.—There seems to be some confusion in the thinking of the obstetricians, without any uniformity of opinion. All lay publicity has been to the effect that obstetric pain is unnecessary, even to the point of changing physicians to achieve that result.

DR. P. J. BARBOUR, LOUISVILLE.—What is the value of the dehydration treatment for brain injury in the newborn infant?

CHAIRMAN PARMELEE.—There have been two articles recently in the *Journal of the American Medical Association* on intracranial trauma. The symptoms may not be due to edema. It may be that edema of the brain of the newborn infant is not to be considered as a cause of trouble. There is a swelling of the brain that is not due to edema, but rather to a change in the brain cells. Until more is known about it, the dehydration treatment seems to give results.

DR. N. C. BENDER, BUFFALO.—Oxygen may be given subcutaneously to combat the cyanosis of the newborn infant. What anesthetic does Dr. Cole consider safe?

ASSISTANT CHAIRMAN COLE.—Local and spinal anesthetics are safe. There is no general anesthetic known that does not affect the infant or that is absolutely safe.

QUESTION.—What are the immediate and remote effects of complemental and prelacteal feeding?

ASSISTANT CHAIRMAN COLE.—Prelacteal feedings probably interfere with successful breast feeding. They prevent weight loss, but this is not harmful unless abnormal, when it suggests some pathology to be investigated.

CHAIRMAN PARMELEE.—Weight loss is an index of shock at times. There is a wide variety of opinion relative to prelacteal feeding, particularly from the standpoint of possible harm. Dr. Sanford showed it reduces the chances of nursing. The infant may be sensitized to milk, although in my experience, this is rare.

The work of Grulee and Sanford in a study of 50,000 infants showed a direct relation between the mortality and the increase in artificial feeding. Apparently there is something in breast milk that protects the infant against death from infection. The problem in the newborn period is to promote more efficient breast feeding. The physician and often even a pediatrician are responsible for decreased breast feeding as a result of the greater knowledge of formula construction. Water or sugar solutions may be used safely during the prelacteal period without influencing the ability of the mother to nurse the infant. Infants fed regularly throughout the entire twenty-four hours gain better and lose less, and the breast feeding is better preserved. The breasts respond to the law of supply and demand. Under the ordinary schedule, one breast may rest twelve hours—all night—without any stimulation. I have suggested the use of both breasts at each feeding when the nipples are normal, and have found that lactation proceeds more efficiently.

DR. BIRNBERG.—What about the 2 A.M. feeding for the newborn infant?

CHAIRMAN PARMELEE.—I feel very strongly on this subject. The obstetricians focus their attention on the mother and ignore the pediatric aspect of the situation. A newborn infant's outlook toward his environment is the same both day and night. This means there is need for the 2 A.M. feeding, especially in the case of the four-hour schedule. The amount of milk which the baby needs in twenty-four hours may not be obtained in five feedings. The breasts need stimulation both night and day. Too long a period without stimulation will reduce the milk supply. To aid in optimum production of breast milk, both breasts should be given at each feeding when the baby is 3 weeks old.

DR. HOYER.—How long is the infant kept at each breast under such a regime?

CHAIRMAN PARMELEE.—Seven to ten minutes on each breast.

DR. W. S. NOLTING, DETROIT.—Does the newborn infant obtain its immunologic protection from the breast milk or the placenta?

CHAIRMAN PARMELEE.—Pfundler speaks of "maternal protective substances" which come through the placenta. The neonatal period may last several months as a result of these maternal influences. The transfer of these substances through the breast milk has not been demonstrated adequately.

DR. S. S. CHIPMAN, NORWALK, CONN.—What can be done in the care of the skin of the newborn infant?

CHAIRMAN PARMELEE.—This should raise a flood of discussion, because of its importance. Pustules, vescicles, and exfoliation do occur and cause much anxiety. The nursery must be under the care of an authoritative person who can formulate rules that cannot be broken. Dr. Sanford has developed a technique of treating the newborn "dirty." The excess blood is wiped off the face and the skin is not touched except to cleanse the diaper area with oil. There have been fewer cases of trouble from this method. Its favorable results are not due to any antiseptic quality of the vernix, but to the lack of irritation of the skin. The chief factors in this method are prevention of trauma from handling, by no bathing during the hospital stay. The vernix disappears within twenty-four hours. Con-

genital pustulosis, a condition which I never saw before starting my work at the Cook County Hospital, is usually a benign condition. Cultures of these pustules were always sterile.

DR. M. R. REYNOLDS, JACKSON HEIGHTS, N. Y.—In view of the absence of breast changes in some newborn infants, is the use of estrogenic substance indicated?

CHAIRMAN PARMELEE.—This was done in Vienna several years ago to premature infants on the theory that they had been deprived of certain growth stimulants. Some favorable results were reported, but it was found that the estrogenic hormone must be given immediately and continuously. Theoretically, it seems logical that immature babies need these substances. I have used a method of giving it in the form of small suppositories over a period of time, each suppository containing 10 R. V., two given each day. At Cook County Hospital we have used routine injections of whole blood from mothers of full-term infants.

TENTH ANNUAL MEETING OF THE AMERICAN ACADEMY OF PEDIATRICS

Nov. 18-20, 1940—Memphis, Tenn.

Report of the Secretary

The Secretary has to report, with great sorrow, the deaths of the following Fellows since the last meeting of the Academy:

D. Murray Cowie
John L. Morse
DeWitt H. Sherman
Isidor H. Tumpeer
Frank Vander Bogert

Associate Fellows:

Glenn Cullen
Bernard Fantus

Emeritus Fellow:

Alfred J. Scott

* * * * *

The American Academy of Pediatrics has now completed more than ten years of actual existence. It is probably time to take stock of our accomplishments.

The Academy started with some seventy members and now has over 1,300. During the first years of its existence, the Executive Board was principally concerned with the type of men it should take and spent most of its time debating the eligibility of certain men. It is evident to everyone that it has made very few mistakes in this respect. Such conservatism was only in order to build up and start a background for future work. Rapidly this work has accumulated until at the present time the Academy has a total of twenty-one special committees, including the Council for Pediatric Research, four Regional Chairmen, four Associate Regional Chairmen, and sixty Province, State, and Territorial Chairmen. The various Committees have been quite active in the lines in which they operate, and I think we can look upon the accomplishments of these with great satisfaction. As the result of their activities, we are much further along toward the solution of many of the problems which have confronted the pediatrician in the past, and we are making our imprint upon the medical phases of lay organization work in a way which could never have been accomplished without such an organization as ours. We may only mention here the film, "When Bobby Goes to School," and the pamphlets which have been issued and are rapidly taken up by our own members, other physicians, and outside agencies, as examples of some of the progress we have made.

Not only are nongovernmental organizations cooperating with the members of the Academy in these various efforts, but also government organizations from the United States Children's Bureau on down through organizations in the states and territories. Gradually, but surely, the Academy of Pediatrics is taking the place in the American picture which should come to an organization composed of men selected for their knowledge of special conditions. More and more the name of the American Academy of Pediatrics carries with it an assurance to those who cooperate with it that they will receive an open-minded, fair, unbiased cooperation from the medical standpoint of the child. Such a position is not without its direct bearing upon the practice of pediatrics if it does nothing more than raise the self-esteem of the man who belongs to such an organization and make him feel that the specialty that he has taken on as his life's work is an honorable one and well worth the hours which he has spent in it.

The Academy has, through the cooperation of many minds, evolved a type of meeting which is gradually assuming a great deal of importance in the field of medicine. It is the Academy which has laid stress on Panel Discussions and Round Table Discussions. In this latter respect we may have gone a little too far. The problem is a very definite one. Any man who comes to a meeting should be assured of attendance at the Round Table in which he is most interested. Under our present system, that frequently is not possible. When we think that we have 1,300 members and that the most we have been able to take care of in the Round Tables are 350 to 450, we see that, to a certain extent, the Round Table is becoming a handicap. I would not have you abandon the Round Table because I feel that it is the best of all methods of imparting knowledge that a medical meeting can use, but I wish you to know the difficulties and realize that the Secretary sympathizes with the man who does not get what he wants. The mere physical setup of the Round Tables makes it impossible to hold our annual meetings except in the largest hotels, and if we increase the number of Round Tables, which could easily be done, we must then confine ourselves to certain large hotels in certain cities. The Executive Board, as well as the Secretary and the Secretary's Assistant, have considered this carefully from all viewpoints, but I am sure I am correct when I say that suggestions from members will be gladly received and considered.

By means of our publicity, we have been able to acquaint the American public not only with what the Academy is doing, but also with what should be done for the child; incidentally, less frequently do we hear that pediatricians are foot doctors.

Through the Council for Pediatric Research, we have helped in many respects the scientific advance of pediatric work and through the E. Mead Johnson Awards we have promoted interest in the outstanding achievements of the younger men in peditaries. We are interested too in our sister nations. We have had most cordial cooperation from the members in Canada, and we are developing scholarships for the training of younger men from the Latin American countries.

In other words, the American Academy of Pediatrics is a going concern. For example, may I cite what happened last summer. Overnight the problem of refugee children from England was put in our laps. The medical care of these children must receive attention somewhere. There was no other organization which was fitted for that purpose. Through the energetic efforts of Dr. Borden Veeder and Dr. Richard M. Smith, who gave up a large part of their vacation time, and the devoted cooperation of other members of the Committee, the organization of the medical care of these children was completed within a few days. Not only was it possible to arrange for the examination of these children at the time of their entry into the United States, but it was possible to designate pediatricians throughout this entire country who would be willing to give their time in the medical care of these children. The response was immediate and hearty. One man with a large practice in a western state wrote me and asked if I thought it was his duty to give up this practice and go as a physician on one of the proposed liners for refugee children.

I trust that this spirit may pervade the organization in the years to come. Your Secretary presents this report with the hope that you share with him pride in what the organization has accomplished and the hope that the future may show a continuation of our efforts for the betterment of the child in America.

Respectfully submitted,
CLIFFORD G. GRULEE
Secretary

Report of Region I

In submitting a report of the highlights of the Academy activities which have been carried on in Region I since the last annual meeting of the Academy, we must first consider what the present world-wide conflagration is now doing to all three phases of child health, physical, mental, and spiritual, in this country and abroad;

second, what is likely to happen to child health in the fateful year that lies ahead; third, in the light of these considerations, what are the definite, immediate responsibilities of us Fellows of the American Academy of Pediatrics as to the preservation of good child health in the United States and in the world at large.

As to the first consideration, the sad fact is that the lights of child health are going out all over Europe, and are dimming in much of the civilized world today. Innocent children are the major victims of the evil, barbaric, mechanized, total wars of today, and child health, in the long run, is found to suffer, even in the countries not yet at war, as staggering military costs mount steadily and absorb an increasing proportion of national income. Even regarding child health as a future military asset will hardly be enough to maintain it at past levels without determined efforts on the part of all of us whose chief interests are in its maintenance and improvement in our United States.

The torch of maintaining and preserving international child health is even now passing to the Americas, and particularly to the United States and Canada. (Many divisions of the League of Nations have been invited to make their permanent home in Princeton University, and among these, if accepted, is likely to be the Child Health Division.) It will be the privilege and responsibility of the American Academy of Pediatrics and its Fellows, in concert with our federal and state official and nonofficial child health agencies, to help keep this torch of international child health alight in this troubled world, and holding it high, to carry it forward in the years to come.

To the utter amazement of the entire world, Great Britain and the British Empire are heroically and tenaciously holding the first line of defense of our Christian and ethical civilization, which includes the American way of child health as we have known it. Let us note for our guidance as to our own future course, in taking care of both her children, our temporary guests, and our own children, that Great Britain is accomplishing this magnificent defense by firm national solidarity and steadfast adherence to, first and foremost, spiritual values; second, to moral and mental integrity; and third, to physical health. It was obviously no happenstance that the Magna Charta of human liberty was signed nearly a thousand years ago in an English meadow.

Let us further carefully note for our guidance as to the threefold aforementoned elements in child health, how these nations who threaten world civilization today completely reverse the English order of importance. They place first physical condition and material values; second, they degrade mental values so as to deny our modern morality completely; and third, they substitute for the spiritual and ethical values of our time, the ancient form of idol worship, setting up sacrosanct individuals and sacrosanct states. Let us follow in our own future course the splendid example and constancy shown by Great Britain.

The second line of defense of civilization, including modern child health, must inevitably be the United States and the Americas. If England falls, which God forbid, we must become the first line of defense. If she holds, for which we devoutly pray, we in the United States must play a major part in helping her in the long and arduous task of rebuilding civilization, including good child health, in a shattered world.

The immediate task confronting the American Academy of Pediatrics is for every one of our Fellows to do his level best to see that every European child refugee, and particularly the King's wards, who have been especially entrusted to our care, get the same square deal in the matter of good pediatric medical care and health-building supervision, that we of the Academy have been steadily building, in concert with other groups, for all of America's children since the Academy's inception.

On this most important task, the National Officers, State Chairmen, and Fellows of the Academy are already busily engaged,* and we of Region I, which at present receives most of these children, will do our best to do a good job in the rehabilitation and readjustment of these unfortunate children in the year to come.

To recapitulate, therefore, three important immediate tasks confront Region I of the American Academy of Pediatrics and the Academy at large:

1. To see that all refugee children get good pediatric medical care.
2. To take up the torch of helping to maintain and promote international child health.
3. To help see to it, together with other groups, that the maintenance and promotion of child health in the United States is not submerged by the national defense program with its gigantic costs, but rather shall be enlarged as an integral part of our American way of civilization.

Amid this troubled turmoil now going on in the world, and with many pressing problems in pediatric practice disturbing our Fellows, it is extremely encouraging to

*For details, see article in the September, 1940, issue of THE JOURNAL OF PEDIATRICS.

note the wholeheartedness and sincere interest which our Associate Regional Chairman, Dr. Lewis Webb Hill, State Chairmen of Region I, and their State Committees and Fellows are showing by their vigorous work in our states, in so many fields of child health. The reports from our State Chairmen are simply amazing, and I am prouder than ever of the way in which our Fellows in every state of this Region are devoting so much time, without reward other than the approval of their consciences, to looking out for the varied public health needs of children in their jurisdictions. This fact alone in my opinion, augurs well, not only for the future of the American Academy of Pediatrics, but the future of pediatric practice itself. Any professional group which responds to the challenges of public child health needs as willingly as our Academy Fellowship has done since its inception deserves high praise from all of us who are privileged to serve them as officers of the Academy.

The year has been a fruitful one for child health in Region I, marked halfway by the splendid regional meeting in April, in Washington, D. C., put on with great success by our Washington Fellowship, under the leadership of Dr. Donnally, Dr. Wall, and Dr. Ong. The meeting was excellent in every respect, and the cooperative spirit with which our Washington Fellowship, the Medical Staff of the Children's Bureau (led by Dr. Martha Eliot, Assistant Chief of the Bureau), the United States Public Health Service and National Institute of Health (with Surgeon-General Thomas Parran), and the health and welfare authorities of the District of Columbia worked together to set up the excellent pediatric program, scientific exhibits, the dinner meeting, and entertainment was a joy to all of us, and developed working relationships between these groups, which I am sure will extend far into the future for the benefit of better child health in our national capital, in Region I, and in the United States.

A further example of the value of this meeting was the dinner meeting held on Friday evening, when the Medical Staff of the Children's Bureau were hosts to the State Chairmen and National Officers of the Academy. At this meeting, our Academy State and Province Chairmen presented progress reports of their jurisdictions and the child health problems they had encountered. The entire Medical Staff of the Children's Bureau presented their programs, particularly the new one aimed at the problem of the child with rheumatic heart disease. A very helpful discussion took place thereafter, with both groups participating freely, in which state and national child health problems were presented and commented on from many angles. Such free discussions, we believe, are extremely helpful toward solving many of the child health questions now facing this country. We hope similar conferences will be held annually in our other Regions, in addition to more such in Region I, as this type of conference, be it national, regional, or state, cannot help but promote sound understanding and consequent cooperative action for better child health on the part of both professional and official groups participating.

A further contribution of value made during the meeting was the holding of a panel discussion, "Factors Influencing the Quality of Medical Care in the Various Types of Pediatric Service," participated in by an able panel. The types of pediatric service covered were: (1) private pediatric practice; (2) voluntary health insurance; (3) hospital pediatric clinics; (4) pediatric service in state health programs, by child health conferences and by school health services; and (5) a special presentation, "The Merit System in Selection of Pediatric Medical Personnel," by Dr. Martha Eliot.

The factors discussed were: (1) training, postgraduate training, and experience of medical personnel; (2) the good will and interest of medical personnel; (3) the responsibility and cooperation of the organized medical profession; (4) reasonable compensation of medical personnel; and (5) reasonable time allowance per patient available in pediatric services.

The feeling prompting the development of this discussion was that there had been an overemphasis on the costs of pediatric medical care during recent years, and an underemphasis on the quality of pediatric medical services that had been developed in the various types of pediatric practice in relation to the costs thereof. We hope that a continuing careful consideration of the factors influencing the quality of medical care in each type will bring all health and welfare authorities and our professions to common ground by continuous joint studies for estimation of the quality now existing in each of the above-named types of pediatric services, as well as to how the quality can be improved in each type of pediatric service. Such common ground is not only desirable, but essential, if the threatened conflicts of the past are to be resolved into a sound policy of cooperation on behalf of child health in the future between our professional groups, public officials, and lay agencies interested in child health progress.

Highlights of Province and State Activities in Region I:

QUEBEC: Chairman Goldbloom, Montreal.—Fourteen French-Canadian and English pediatricians have been elected Fellows, out of a possible twenty-three eligible for Fellowship in the Province of Quebec. In addition, Dr. Albert Guilbeault has been appointed Chairman of the Province Committee on Child Health Relations and is now engaged in developing the interest of his French-Canadian confrères in the objectives of the Academy. This collaboration between Dr. Goldbloom and Dr. Guilbeault will undoubtedly bring about closer cooperation between the English and French-Canadian pediatricians, and consequently the English and French-Canadian child health activities in the Province.

ONTARIO: Chairman Tisdall, Toronto.—A number of our men, including myself, are devoting either their whole time or a great deal of their time to military work. Possibly the most recent work of interest to you is the organization of the handling of refugee children coming from Europe. A complete organization has been set up in the Province of Ontario, with the advice of Dr. Alan Brown, Professor of Pediatrics, University of Toronto, and Physician-in-Chief of the Hospital for Sick Children, one of our Fellows, under the Departments of Health and Welfare of the Province. Every child coming into the Province of Ontario is examined by the staff of the Hospital for Sick Children, tuberculin tests, x-rays of the chest, diphtheria toxoid, and other preventive procedures being carried out. After examination the children are placed in homes throughout the Province. Already several hundred have come into Ontario under this government scheme, and it is working nicely.

MAINE: Chairman Webster, Portland.—Dr. Webster reports a great deal of activity in the preschool and school child health field—nutritional work, work for crippled children, consultation services for acute cardiac conditions. Last, but not least in importance to child health, was the election of Dr. Thomas Foster, former State Chairman, to the Presidency of the Maine State Medical Association. Dr. Webster states: "Among Dr. Foster's first activities was the appointing of pediatricians to the Maternal and Child Health Committee of the Maine Medical Association."

NEW HAMPSHIRE: Chairman Rogers, Manchester.—Continued progress of our newly formed State Pediatric Society. Stewart and Rogers on Committee to define hard of hearing so that state may aid children in progress of education. Stewart and Rogers asked by State Board of Health to write articles on various medical subjects for monthly State Board of Health pamphlet. Dr. Winograd during the year made a study of the Vollmer patch test in cooperation with the New Hampshire Tuberculosis Association. Refugee child problem not as yet considered because of Germany's attitude. The New Hampshire pediatricians will be glad to cooperate with the national association if and when these children arrive. Voluntary health insurance companies report lack of interest by the public in hospital insurance.

From Dr. Stewart's interesting report of the Committee on Child Health of the Academy to the New Hampshire Medical Society House of Delegates, two quotations are appended: (1) concerning pediatric consultation service; and (2) (a much desired activity of the State Department of Health which we hope other State Departments will soon copy) the utilization of pediatricians at crippled children's clinics.

"1. A consultation service utilizing two pediatricians appointed by the State Board of Health was instituted during the fiscal year. The duties of these consultants are: (a) To serve local physicians by acting as consultants on pediatric problems; (b) to evaluate the conduct at existing child health conferences and to aid in the setting up of any conference; (c) to advise in the selection of literature on subjects of child health for free distribution to the public; (d) to aid in the teaching program to lay and professional groups concerning matters of value in problems of child health and pediatrics; (e) to conduct teaching child health conferences; (f) to evaluate and aid in the working out of conference forms, such as records, at child health conferences; and (g) to carry out such other advisory services in the field of child health as may present."

Action by the Divisions of Child Health and Crippled Children.—"2. The utilization of pediatricians at crippled children's clinics to insure better care of the child and a general health appraisement of the child who has a crippling condition."

VERMONT: Chairman Clark, Burlington.—Reports a very complete program of child health activities in that state under his leadership, including preschool children, school children, medical supervision of camps, health education, state conference on better care for mothers and babies, professional education, pediatric care for refugee children, maternal and child health services, child health confer-

ences, immunizations, correction of physical defects in children, and two programs hereinafter quoted: (1) voluntary health insurance programs; and (2) program for premature infants.

1. At the present time there are several voluntary health agency programs in effect in the state. One, the Farm Security Program, which has been in operation for about a year, has most of its dealings with the general practitioner in rural areas and includes all the pediatricians in Burlington. This program is under the control of the State Medical Society.

2. Twelve incubators for premature infants were purchased by the Maternal and Child Health Division and placed in various hospitals throughout the state. A special effort will be made during the coming year to lower the mortality rate of premature infants. Instruction in the care of prematures will be offered the general practitioner through a refresher course given for the different county medical societies. The Vermont State Nurses' Association has already asked for a talk on the care of premature infants to be given at their fall meeting.

MASSACHUSETTS: Chairman Sisson, Boston.—The Academy, State Medical Society, and State and local Departments of Health, with their excellent working relationship, are doing their usual good job of forwarding the various child health services in Massachusetts. A particular activity of Dr. Sisson and President-Elect Richard Smith has been the development of the care of refugee children, not only in Massachusetts, but in all New England and the Middle Atlantic states.

A development of great importance to all pediatricians in the Academy is the resolution for adoption at our Memphis meeting, by Dr. Harold Stuart of Boston, Chairman on Problems of the Fetus and the Newborn Infant. This resolution embodies specific recommendation as to how pediatricians should develop their proper place in all hospitals in the care of newborn infants in association with obstetric services.

Two activities of interest are quoted:

"The most important activity has been the reorganization of the New England Pediatric Society under the aegis of Academy members. Similar developments have taken place elsewhere, and we can report a very successful accomplishment in broadening the influence of the Academy by greatly enlarging the membership of the local pediatric society which is made up of a great many general practitioners particularly interested in pediatric problems. The council of the New England Pediatric Society is made up of members of the Academy who meet monthly to discuss the general problems concerning the health of children, both in Massachusetts and in other New England states.

"It has also been the policy of our Academy members to extend to neighboring states in New England our help in promoting graduate instruction in pediatrics. The membership in Vermont and New Hampshire is necessarily quite limited, and there is a definite need for further pediatric interest in many of our New England communities."

RHODE ISLAND: Chairman Utter, Providence.—Special mention is made of the investigation concerning premature deaths and the study of the laws governing medical care of summer camps in Rhode Island.

During the winter of 1938-1939, a series of lectures was given in each county of the state. These lectures were not satisfactory. Comparatively few doctors came and the interest was not great. This year, believing that to get this thing started the presentations should be as good as possible, we are taking five speakers at a time to each county and giving a panel discussion. To date these have been on preventive inoculations. These presentations have been very successful, both in attendance and in interest shown.

CONNECTICUT: Chairman Stringfield, Stamford.—There has been developed one of the best working relationships between the Academy, the State Medical Society, and health and welfare organizations of any state in the Union. This has resulted in many forward steps in the various fields of child health, plus good integration of medical men in each program. It will pay any state chairman who is interested, to study, at Memphis, the Connecticut complete report, as he will be bound to get some very valuable ideas which might be transplanted to his own state development of academy activities. Quotation is appended (1) of the way the Academy Fellowship is integrated in the State Medical Society program, and (2) of the new pediatric consulting service and qualifications of consultants.

"1. Child health activities have continued, and new services have been inaugurated. The Public Health Committee of the State Medical Society is the coordinating link with the State Department of Health. This Committee has a subcommittee on pediatrics, consisting of three Academy members. All programs pertaining to child health are submitted to this body for discussion and approval.

"2. A pediatric consulting service has been outlined and approved which will make available consultants for those so-called "in between" cases, thus making pediatric service available to all groups of people. The problem of outlining the qualifications necessary for appointment as a pediatric consultant was difficult to solve. The following qualifications were adopted:

a. Practicing in cities or groups of towns of 50,000 or over
   1. Membership in the Connecticut State Medical Society.
   2. Certification by the American Board of Pediatrics.

b. Practicing in cities or groups of towns of less than 50,000
   1. Membership in the Connecticut State Medical Society.
   2. At least one year's rotating internship, including pediatrics.
   3. At least one year of hospital training in pediatrics plus five years of practice including pediatrics (the physician should have been on the pediatric staff of his general hospital during these five years), *or*
   4. Consideration will be given to physicians who have taken graduate work in pediatrics, *or*
   5. Consideration will be given to physicians who have been responsible for the pediatric service of their local general hospital for ten years or more.

"All applications will be reviewed by the Public Health Committee of the Connecticut State Medical Society, and its recommendation will depend upon the applicant's training, experience, and personal integrity."

NORTHERN NEW YORK: Chairman Beaven, Rochester, *May, 1940, Report.*—The Academy members in upper New York State are really working with me in trying to make pediatrics count for more than it has counted for previously. I have had a number of talks with different members from all over the state, trying to get from them what they consider to be an ideal program for their communities.

There have been appointed members for this district on each of the main committees which function in the national organization. Dr. Orr, of Buffalo, works on the Committee on Contact Infections; Dr. Shaw, of Albany, on the Committee on Child Health Relations; Dr. Bradford, of Rochester, on the Committee on Association with Nonmedical Groups; and Dr. Doust, of Syracuse, on the Committee of School Health.

We are planning this year at last to have a program in each of the four districts, that is, Buffalo, Rochester, Syracuse, and the Capital districts, for the men doing country practice in these districts. Last year they were a tremendous success, and I hope this year they will also be helpful. They were well attended and interest was great.

We have gathered data which show the relationship of pediatricians to public health work in the different counties. It is not great. There has, been, however, a fine Public Health Committee made up locally recently; a Child Health Committee for the Monroe County Society which is going to do, I feel, excellent work. This Public Health Committee is composed primarily of members of the Academy and Dr. Bush, who is Chairman for the Rochester District, is its chairman. They have gone to work on a number of problems. One of them is the hospital care of children; another is the tuberculin testing in schools. Another is the care of feebleminded children, and a number of other projects have been started. It is hoped that this will set an example as to what the Academy can do in different counties in upper New York State.

Another project which is contemplated is a meeting of all the members who belong to the Academy in upper New York State. This will be held in Rochester in May and will be a meeting which will discuss exclusively the problems confronting Academy members. A panel discussion of problems arising in each of the four districts will be held. Reports of the different committees will be given. Also, it is planned to have a discussion of the work that is going on in Washington and Albany. In brief, this meeting will be not only to acquaint ourselves with the men who are members within our district, but will also be a means whereby we can integrate the work and let everybody know what the other man is trying to do.

September, 1940, Report.—This year all four districts in the upper part of New York State either have had or will have a meeting for rural practitioners. This is an undertaking of the members of the Academy which I believe is successful. This spring Dr. Faust had the meeting for the Capital district. There were about sixty-two present from thirty-six small towns. Dr. Silverman is having a meeting of the Syracuse District on September 26. Dr. Bush of the Rochester District is having his meeting on October 24, and on October 31 Dr. Arnold is having a meeting of the Buffalo District. These programs, in general, last the better part of a day and are given over to a discussion of the problems that confront the rural practitioner in the field of pediatrics. They are practical discussions. These meetings are partially sponsored by the Bureau of Maternal and Child Welfare, of which Dr. Gardiner is the chief.

There has been considerable discussion regarding a tentative setup for crippled children other than those orthopedically handicapped. There has also been considerable discussion among members regarding changes in the law having to do with school health and its direction both from Albany and from local sources. There has been considerable activity on the part of Dr. Orr's committee on contact infection. The Rochester part of that committee, whose chairman is Dr. Posson, secured Dr. Fairfax Hall as speaker at the annual dinner of the Tuberculosis and Public Health Association. In cooperation with the local county medical society, a program is being worked out here in Rochester which will make available to all who wish them domestic servants and nursemaids who have had an x-ray examination for tuberculosis.

The new activity for the year was a business meeting which was held last fall. To this were invited all of the members in upper New York State, and about 80 per cent attended. Those that did not come, with one or two exceptions, could not possibly have been there. The meeting was held for the purpose of acquainting the members with the projects of the Academy within this unit. Speakers included the Chairman of the Committee on Contact Infections, the Chairman of the Committee on School Health, the Chairman of the Committee on Child Health Relations, and the Chairman of the Committee on Cooperation with Nonmedical Groups. Each one of the subchairmen for the different groups in the state reported on the meetings held the preceding year and plans for the meeting this year and for any other project they were sponsoring within the district. A report was made by members who live in the different communities on how much public health work was being done within that community. This was the outcome of a questionnaire which had been sent out the preceding year. Of special interest was a report by Dr. Bush of Monroe County and Dr. Doust of Onondaga County showing what was being done in those places by the Committee on Child Health. They pointed out that the unit most responsible for progress in child health was the Child Welfare Committee of the county society. Dr. Kaiser spoke of the work being done by the national committee in charge of crippled children aside from orthopedic cripples. Dr. Elizabeth Gardiner, Chief of the Maternal and Child Hygiene Department in New York State, talked about the relation of her department to the Academy of Pediatrics and gave us some suggestions as to what we could do to help her with her work. Dr. Cyrus Maxwell, Chief of the School Health Division in Albany, talked about the relationship of the Academy to his department, and Dr. Jessie Bierman, Assistant Director of the Children's Bureau in Washington, gave us a talk on what her department was doing, not only in our district, but in other parts of the country. She showed how this work was related to the Academy. A copy of the transactions of this meeting was sent to every member whether or not he was present at the meeting.

SOUTHERN NEW YORK: Chairman A. T. Martin, New York City.—Southern New York has the largest number of Fellows in any one area in the United States.

Because of the quite large representation of Fellows in Southern New York, the activities of the Academy are well diffused, and these Fellows contribute in large measure to many of the child health projects within the City of New York and outside. Special note should again be made of the progress of the special committee on prematurity appointed by the Commissioner of Health. Optimum standards of care have been set up for the guidance of the hospitals concerned with the care of the premature infant, born inside or outside the hospital. Close integration with the Henry Street Nursing Service has been established for their care after discharge. Optimum requirements for autopsies have been defined for better statistical records.

Through the State Committee on Contact Infections, progress has been made in the examination of children's nurses at moderate fees, and important publicity has been given to this phase of child care.

Through a special Committee on Child Welfare, a real effort has been made to do away with lead nipple shields in the maternity hospitals in which they are used.

Meetings have been held with the Mothers' Milk Bureau and standards have been established in the preservation and canning of this milk. The Academy has been asked to supervise, coordinate, and set standards for the Mothers' Milk Bureaus in this country and Canada.

Real progress has been made in the care of the child with rheumatic heart disease, in that sanitarial care has been provided for a limited group of children who are still in the active phase of the disease. This has been done through the State Commissioner of Health. As far as is known, no state plan for the care of the child with cardiac disease has as yet been submitted to the Children's Bureau. The American Heart Association has been contacted and questioned as to the segregation at school of children with cardiac disease. Final decision on this has not yet been made.

In mid-August an important meeting was held at the Academy of Medicine to organize and to formulate plans for the care of children from Europe, if and when they should arrive. Problems were discussed relating to the present emergency, and procedures were discussed for the reception, quarantine, examination, and distribution of these children after arrival.

The Academy Committee on National Defense and Relief may count on the help and cooperation of the Academy Fellows in New York City to meet the emergency when it may arise. This seems to be the most important and urgent problem which the Academy now faces. Its immediacy depends upon the safe transportation and conduct of these children from foreign shores.

NEW JERSEY: Chairman Wilkes, Trenton.—A very able, well-knit program of child health throughout the state is carried on in close conjunction with the Bureau of Maternal and Child Health of the State Department of Health and the State Medical Society. The Academy State Committee is identical with the Child Health Committee of the State Medical Society and advisory to the Bureau of Maternal and Child Health of the State Department of Health, and the values of this tieup are, of course, apparent.

School health medical work remains on the same level that it has for many years, in spite of urgent efforts and multiplicity of recommendations. The improvement of health is approved in principle by school authorities, but there has been largely a horizontal spread of the same low caliber efforts which we have always had, because of the inadequate compensation, either financial or in terms of professional approval, of this type of work.

The school teacher is not genuinely concerned in the physical improvement of her pupils to the extent that the profession will put up adequate funds and facilities and seek medical guidance and cooperation at a fair return. The school administrator is concerned primarily in the protection of his invested capital, and where contagion decimates his attendance, he is willing to spend some money. He is not willing to send home children with a mild cold because it cuts down the appropriation based on the attendance, and it is this appropriation which he protects at all times instead of the children. This is only human nature, but the ideals so frequently emphasized in educational circles are not fully matched up with the practical conduct of the health work of the schools. The reason is that the financial say lies in the hands of educators who control the pursestrings, rather than in the hands of physicians who fully appreciate the needs and know how best to meet them.

The following statement of the Child Health Committee of the State Medical Society and the State Academy Committee on refugee children is quoted, definitely including the refugee child in our child health programs on exactly the same basis as our own American children.

"The decision of the Committee is that no child, be he resident, refugee, guest, or other, shall fail to receive medical services because of the inability of his parent, foster parent, or guardian to pay for such services. We do not believe it advisable to set aside any special group of children for any special privileges, but rather to see that they receive the same opportunities and medical services that we are developing for our own American children."

A large number of the Academy Fellows are actively engaged as consultants and advisors to the seventy physicians conducting the Baby-Keep-Well stations of the Bureau of Maternal and Child Health of the State Department of Health. The statement of Dr. Julius P. Levy, in charge of that Bureau, is to the effect that already there has been a considerable improvement in the quality of pediatric keep-well medical service in the stations, as a result of (an average of) two or three visits to each station by the Academy Fellows.

Fellows and health departments in other states or cities, interested in this development and its details and wishing further information, might communicate with Dr. Julius P. Levy, at the State Department of Health, Trenton, N. J. He will be glad to outline the practical organization of the development to date. As this is the first state to get actively under way with this project of the Children's Bureau and the Academy, it may be of considerable value to the Fellows in many states (particularly those on the State Child Health Relations Committees) to become conversant with this first example of a constructive program, which has for its definite object the improvement of the quality of medical services rendered in the 3,000 Child Health Conferences carried on in the United States with the assistance of federal funds.

WESTERN PENNSYLVANIA: Chairman McCluskey, Pittsburgh.—Child health activity in Pennsylvania during the past year has been more actively pur-

sued in the rural regions. Dr. Dodds, who heads the Department of Maternal and Child Welfare in the State Health Department at Harrisburg, has formed a committee to deal with maternal and child programs throughout the state. The committee is composed of representative obstetricians and pediatricians and serves in an advisory capacity for a state health program. The most time has been devoted to (1) rural well-baby clinics; (2) an attempt to increase laboratory facilities in the rural sections. Work with well babies has been progressing in the cities much the same as in former years. Very little has been done with the work of special committees.

Funds for child welfare have been cut in the state economy program. We hope that this is temporary. The insurance program advised by the state medical society is a voluntary one and should affect the pediatrician very little.

We shall be able to take care of a normal number of refugee children when such shall arrive.

EASTERN PENNSYLVANIA: Chairman J. M. Lyon, Ardmore.—A very important observation in Pennsylvania today is that members of the Academy hold many key positions in directing the neonatal, infant, and children's activities in the state.

Dr. Francis T. O'Donnell of Wilkes-Barre is Chairman of the Child Health Committee of the Pennsylvania State Medical Society. This is a very active committee that works through child health committees of county societies. Dr. O'Donnell has thirty-two counties well organized and is using W.P.A. assistance. Twenty-one other counties have child health committees as part of their setup, without any federal aid. Only eight counties in the state have no child health committee.

The large advisory committee of the Bureau of Child Health and Maternal Welfare in Pennsylvania has seven, or now possibly eight, members of the Academy of Pediatrics. The present director of the State Department of Health, Dr. John J. Shaw, is deeply interested in a strong child health program. His appointments of Dr. Paul Dodds, an obstetrician of Pittsburgh, as director of the Bureau, and of many men representing medical organizations on the advisory committee of the Bureau, have indicated that appointments were made on a professional rather than political basis. Dr. Shaw expects to call meetings of the committee quarterly, and to be guided by the advice of the committee. One long meeting was held in Harrisburg on Jan. 10, 1940, and many points of interest relative to conduct of the Bureau were discussed. Dr. Phillip Williams of Philadelphia is chairman of the committee. His reputation in the field of child health and maternal welfare assures us of capable leadership. Plans are progressing for application of the merit system to the Bureau. We hope that if this goes through, it will help in getting and holding good men in the Bureau.

The clinical work of the Bureau, together with that of Dr. O'Donnell's committee, constitutes an important part of the organized child health work in Pennsylvania. The clinicians of the State Bureau of Child Health and Maternal Welfare take their patients, in health matters, through infancy and childhood. Dr. O'Donnell's men do periodic examinations of selected preschool children. They report a high proportion of corrections accomplished. It is the purpose of the leaders in these different organizations to cooperate and not to overlap either geographically or professionally. They also try to limit their services to those patients who cannot afford to pay a local private physician.

Dr. Ralph Tyson is chairman of the Neonatal Mortality Committee of the Philadelphia Pediatric Society, cooperating with the Obstetrical Society and the Philadelphia County Medical Society. Also working with Dr. Tyson are Dr. Emily Bacon, Dr. R. H. Weaver, and Dr. Irving Wolman. The committee is studying the causes of neonatal deaths in Philadelphia County. These monthly meetings are semiofficial within the medical group. They are well attended by pediatricians and obstetricians.

Dr. Howard C. Carpenter is chairman of the Committee for Pediatric Education of the Pennsylvania State Medical Society. I feel sure the activities of this committee will increase within the next year, to cooperate with the health work of the above-mentioned organizations.

There is close cooperation between the State Health Department and the Philadelphia County Medical Society and the Philadelphia Board of Health. These organizations are carrying on the health objectives of our Academy. Members of the Academy hold active and advisory positions in the former two organizations.

An insurance plan is sponsored by the Pennsylvania State Medical Society. Its plan is being tried out in Dauphin County, and later may be used, if advisable, in other counties. Pediatrists may, but are not required to, enter the plan.

The child refugee work is being directed here, as far as the Academy is concerned and as far as the needs extend, by Dr. Joseph Stokes, Jr., and Dr. T. F. McNair Scott. There has been little call for help here.

Dr. Lyon is sending out a questionnaire to his Fellows to find out in detail just what they are doing along the Academy line of objectives. It is here appended as it is a good example of how a State Chairman might find out what his Fellows are doing, and consequently organize them for more active participation in state Academy programs.

To Pennsylvania Fellows of the American Academy of Pediatrics

1. Are you working on any of the projects under the Child Health Committee of the Pennsylvania State Medical Society of which Dr. F. T. O'Donnell is Chairman?
2. Are you working on any of the activities of the State Child Health and Maternal Welfare Bureau under the direction of Dr. Paul Dodds in Harrisburg?
3. Are you doing any local, county, or state children's health work other than the above?
4. Are you carrying on any pediatric research?
5. Do you teach undergraduate medical students in pediatric subjects?
6. Do you teach graduate medical students in pediatric subjects?
7. Do you teach classes of nurses in pediatrics?
8. Have you in the past year given one or more talks on pediatric subjects to medical groups --------; to nonmedical groups --------?
9. Do you see needs in your community that the Academy should help to fulfill? (Please specify on back of this blank.)
10. Is there some new kind of activity for promoting health of children going on in your community that would be of interest or assistance to the Academy in this state or in other states?
11. Are you working in any special pediatric work relative to a plan for national defense?
12. Have you attended regional or national meetings of the Academy in the past year?
13. Do you expect to attend the Memphis convention, November 18-20?

DELAWARE: Chairman Handy, Wilmington.—Contact Infections: Three of our four hospitals in Wilmington have cooperated with us and are doing physical examinations, including blood Wassermann tests and vaginal smears for gonorrhea, on any nursemaids or domestic helpers whom we refer to them. We are carrying on an active campaign along these lines.

2. The tuberculin testing in the large rural consolidated schools has been carried on throughout the year. In each school the parents' written permission and the name of the family physician were secured before the tests were done. In the case of the positive reactor, a note was sent to the physician saying that, if he so desired, an x-ray of the child's chest would be taken at the state tuberculosis sanitarium. When these requests were in, the children were transported by bus to the sanitarium, the x-rays taken, and the reports sent to the family physician. In this way, there was no friction. During the year, twelve schools and eleven clinic groups were tested, making a total of 1,654 children.

MARYLAND: Chairman Smith, Baltimore.—The advisory committee to the Bureau of Child Hygiene of the State Department of Health is the maternal and Child Welfare Committee of our State Faculty. This committee consists both of obstetricians and pediatricians. All of the latter are members of the American Academy of Pediatrics. We meet several times a year, discuss state work, and the obstetricians go over the maternal deaths, pointing out how some of them might have been prevented. The difficulty, however, is that practically all our work is in the rural areas and in small cities outside of the city of Baltimore, and practically all the membership of the American Academy of Pediatrics lives in the city of Baltimore.

The state department has an obstetric and a pediatric consultant, the latter on full time, who does a good deal of consulting with doctors concerning their patients, going about the state on schedule, and being on call between times. Nearly all the twenty-three counties hold regular child health conferences under the direction of the country health officers, assisted frequently by the local physicians approved by the county medical society. Where facilities exist, the tendency now is to hold what we call combined prenatal and child hygiene clinics, an obstetrician holding the first and a pediatrician or local experienced physician the second. The only objection to this is that the quarters are sometimes too small.

A number of the Fellows of the Academy serve as medical advisors to various nonofficial agencies in the State. All the appointments in the health department are under the state or city merit system, except such physicians as may be employed from time to time to conduct conferences.

Dr. D. C. Wharton Smith has interested himself actively in the pediatric care of emigrant children from England who may be sent to Maryland, and he has been in

touch with Dr. Eliot of the Federal Children's Bureau in this matter. Dr. Smith feels that there will be no difficulty in securing efficient supervision of these children.

This is quite similar to our report of last year, as Maryland is well organized and there is very little else to report.

DISTRICT OF COLUMBIA: Chairman Donnally, Washington.—The Fellows of the District of Columbia put on an extremely successful and valuable meeting in the nation's capital in April of this year. The constructive groundwork set by this collaboration between the federal and District of Columbia child health officials and the Academy Fellowship in the District of Columbia will, as pointed out elsewhere in this report, be of inestimable value in the further cooperative development of child health in this important area. We thoroughly believe that the District of Columbia, with its great wealth of all types of facilities for organization and development of child health work, should be the model child health center of these United States. We are hopeful that, as a result of the April regional meeting, each year will see marked progress by all groups concerned, including the Academy, toward the attainment of this most desirable ideal. Our nation's capital should be the shining example, in the years to come, of a model place where all needs of children are met and where there should be, as nearly as is humanly possible, a cordial concert of all concerned with child health.

A setup which included all child health agencies, national and local, with a central representative group, could work toward this ideal and continuously adjust, with much good will and wisdom, the necessary constituents of the working machinery essential to bring this model child health center into being. If we are to really provide for the needs of children in a democracy, we must work toward developing some good voluntary child health setups in this country, which others may visit (as we now visit other good health setups), for the purpose of observing just how the job can be well done by continuing conferences and voluntary adjustment of the three groups who are essential to the development of a high quality child health program. The outstanding example of this type of development should be, and could be, in Washington.

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From these State Chairmen's reports, it will be seen that the Fellows of Region I are busy in the promotion of the Academy's general objectives, as well as the development of many unique child health programs in some of our states. The general response in all of our states on the part of our Academy, to the needs of child health, as presented, by official bodies or lay agencies, has been willing and hearty, and our Fellowship in Region I is fully living up to its responsibilities as the key child health group in our jurisdiction.

Respectfully submitted,
STANLEY NICHOLS,
Regional Chairman

Report of Region II

This finishes my eighth and final year as Chairman of Region II. This report might be considered in the nature of my "swan song."

The Academy has made great advancement for a young organization, but there is still considerable room for improvement. First among the steps in the right direction might be mentioned our separation of meeting times from those of the American Medical and the Southern Associations. We did not separate from these organzations because of a lack of interest; we are vitally interested in them. We must foster these sections in every way because that is our means of communication with the general practitioner. By this separation, we have assumed an identity of our own. Further, we are able to give publicity to the Academy and to let the public know what the Academy means. This is of benefit both to the organization and to the individual member. Many of the members do not yet understand the purpose of the Academy, as will be shown by this report.

The purpose of this organization, as I understand it, is to benefit the children of America and to raise the standard of pediatrics. There are three ways of benefiting child health: by legislation, by subsidization, and by education. As you well know, we are not in a position to subsidize. We can control legislation through our various committees to a certain extent, but our main function is education. We have national committees appointed to govern and direct us in every way possible. It has been suggested that each state appoint committees conforming to the national. This has been done in most of our states, but it stops with the appointment. The national committee and the state committees are not working together yet. As you can see by the following reports, many of the State Chairmen are

apologizing for doing a splendid piece of work through other organizations. To my mind, the Academy wishes results. They are willing to work under cover with no thought of reward, and would as soon do it through other organizations as through their own effort. Their wish is simply to show the way.

The Academy now has approximately 1,300 members, but it will never succeed to its fullest extent until all 1,300 are working. At the present time, too many of the members are depending upon the officers of the Academy.

At its inception the Academy was divided into regions, and, I consider, very wisely divided. At the time of the organization, while pediatrics was well organized in some of the regions, there was little or no organization in others. I believe that no other region has advanced as much as the South, or Region II. This is not due to any of my efforts, but to the support I have received from the membership. There has been talk about changing the boundaries of the Regions. I think this would be a mistake, as we are now in the developmental stage. Give us a few more years and pediatrics will come into its own in the South.

Every man has a particular forte, if he can find it—either in clinical research, scientific research, pediatric teaching, organization, or good clinical practice. We are trying in our Region to assist the individual member to find his bent and then to proceed along those lines. We expect the South to contribute a great deal more than it has in the past. Every state is represented in this report.

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Reports of the State Chairmen of Region II:

ALABAMA: Chairman Lamar, Birmingham.—The activities of the Academy in Alabama are centered in the annual meeting of the State Pediatric Society, which is meeting here at present.

When a local Committee was formed to take care of the refugee children who may be received from England, the services of the local Academy were offered. There have been no further activities to report.

ARKANSAS: Chairman McMullen, Pine Bluff.—This report on the activities of the Academy in Arkansas will not be at all flattering; as a State Chairman I am willing, but apparently ineffectual.

Death claimed Dr. Alexander C. Kirby, one of our best beloved and most active members, and one other member saw fit to sever his connection with the Academy.

The meeting of the State Pediatric Society was, at least, not encouraging because those on the program failed to appear. We had a good round table discussion at luncheon time, that being the one bright spot in the meeting. Dr. Jean V. Cooke gave us another six weeks' "refresher course" and no doubt did a great deal of good.

We four remaining members are not dismayed, however, and still stand ready to cooperate with headquarters in any way possible.

FLORIDA: Chairman Quillian, Coral Gables.—In taking inventory of Academy accomplishments during the past year, we have attempted to answer the following questions propounded by a thoughtful member:

1. Does the national organization justify its existence?
2. Is the organization leadership as inspiring and capable as it should be?
3. Has there been any really worth-while good accomplished?
4. Have we made any real progress toward solving the problems of the pediatrician?

Progress has been made. The Academy is becoming recognized by leaders in other walks of life; the unselfish interest and idealism of its founders are already beginning to be felt in our state. Aid is sought from Academy members for selection of speakers on child health programs and in the solution of problems pertaining to child welfare. Individually, Academy members have taken the initiative, are working with existing organizations for lay education in matters of child health. This alone would justify our existence as an Academy. Perhaps some of the leadership has been lacking in vision. But the future of the Academy is based upon the interest and enthusiasm of the individual member. Increased activity of the membership and participation in the program conceived by national committee chairmen and regional officers will measure the effectiveness of Academy work in any section of the country.

A very pleasant feature of the work during the past twelve months in Florida has been the friendly cooperation of the Bureau of Maternal and Child Health under the supervision of Dr. F. V. Chappell and Dr. W. H. Ball. Counties with local health units held 125 maternal and forty-six well-baby clinics, conducted by local pediatricians. Through funds obtained from the Children's Bureau they paid all expenses incident to bringing a pediatrician as lecturer during the short course of postgraduate education, sponsored by the Florida Medical Association.

The State Board of Health, under the leadership of Dr. A. B. McCreary, also provided funds used to defray expenses of forty general practitioners in rural com-

munities of the state in order that they might attend this short course of postgraduate instruction in pediatrics, obstetrics, and gynecology, at Jacksonville.

The Committee on Child Health of the Florida Medical Association, the chairman of which is an Academy member, is attempting to obtain legislation providing compulsory vaccination of school children against smallpox. The Academy has been requested to provide speakers for the Federation of Women's Clubs and for the Parent-Teacher organizations of the State in connection with a simultaneous one-hour program on child health.

We have edited and contributed short articles in the State Medical Journal, and (through the Board of Health) in newspapers of the state, on well-baby supervision and on immunization.

With the cooperation of Mead Johnson & Co., we have been able to present the film, "When Bobby Goes to School," to selected groups in the larger cities of the state.

Academy members have participated actively and assumed responsibility for child welfare work undertaken by social agencies, the Junior League (Tampa, Jacksonville, and Miami), and medical examination of school children.

The Florida Pediatric Society, Inc., was founded by Academy members five years ago. Its sphere of usefulness and influence is growing. This organization has semiannual meetings, serves to solidify the activity of all eligible pediatricians of the state, and provides a medium through which the regional program of Academy work can be expressed.

The membership of the Academy in Florida feels that the next ten years will be marked by a much broader scope of effective Academy activities; and that the success of the whole program depends upon cooperative effort. Leadership becomes more inspiring and capable in direct proportion to the activity of the individual member.

GEORGIA: Chairman Funkhouser, Atlanta.—This report of the activities of the various committees of the Academy during the past year shows that, while some of them have been quite active, others seem to be dormant. I believe that as soon as the national committees complete their programs these committees will all function. It is no lack of interest on their part, but an absence of a concrete plan for procedure.

The Committee on Child Health Relations. Dr. W. W. Anderson, Chairman.—The Committee, either in whole or in part, is constantly in contact with the members of the State Health Department, and more intimately with the State Bureau of Maternal and Child Health, which in Georgia is an integral part of the State Health Department. This Committee is the main coordinating link between the State Department of Health and the State Medical Society. No other duties than those outlined in the original six-point plan of the Child Health Relations Committee have been assigned to my Committee. The Maternal Child Health Centers in Georgia continue to grow, both in number of established clinics and number of patients attending those clinics which are already established. These clinics in Georgia are under direct supervision of the State Medical Society, which depends on the recommendations of the Child Health Relations Committee. All child health pamphlets, publications, etc., sent out by the State Health Department are first submitted to the Committee for its approval. In Georgia the director of the Crippled Children's Division of the State Welfare Department is a trained pediatrician. The executives of the Maternal Child Health Bureau used trained pediatricians, preferably members of the Academy of Pediatrics, in all child clinics where such pediatricians are available. In outlying districts other members of the medical profession are used.

The Committee on Contact Infection. Dr. Joseph Yampolsky, Chairman.—We have tried to follow out the course outlined by the Committee when they met in Cincinnati last year. This is being done primarily through the Parent-Teachers' Association and the Public Health Speaking Bureau. Emphasis is being laid this year on contact infections with servants, and young mothers are encouraged to have their nurses checked for tuberculosis. Emphasis is also being laid on requirements of treatment for those who present a positive Wassermann test.

The Committee on Cooperation with Nonmedical Groups and Societies; Camping. Dr. Ben Bashinski, Chairman.—As a result of the activities of this Committee, the State Board of Health prepared for distribution a very comprehensive pamphlet for the guidance of camp directors. They have offered the services of the Health Department, especially the Engineering Department, in an advisory capacity. Plans were made for inspection of the private camps in the state. The Health Department, with the cooperation of the Camping Committee, is planning to prescribe minimum standard requirements, with annual inspection, and hopes to get legisla-

tion that will permit the Health Department to require all camps to conform to a minimum standard or cease to operate.

The Committee on Parent-Teacher Associations. Dr. L. D. Hoppe, Chairman.—There has been no meeting of this Committee, nor any instructions from the National Committee as to method of approach to the problem. The Parent-Teacher Associations are so well organized and their program so definite that I, personally, feel that any interference by the Academy Committee would probably be resented.

The Committee on School Health and School Health Education. Dr. Lee Bivings, Chairman.—This Committee has conferred with the State Health Commissioner, and with the State Health Department Pediatrician on the various problems relative to the plan of the National Committee. The Health Department is using some of the material offered by the Academy, and is cooperating with the Academy Committee in all plans offered by the National Committee.

The Committee on Mental Education and Mental Hygiene has had no definite program outlined for them to follow, so have not functioned.

The 1940 directory shows that we have seventeen members. There are at least thirty men certified by the American Board of Pediatrics, which leaves about thirteen available men eligible for membership in the Academy. Most of these men will, I believe, sooner or later be enrolled in the Academy.

KENTUCKY: Chairman Barbour, Louisville.—The members of the American Academy of Pediatrics in Kentucky have been very active in a program of clinics, conferences, and educational addresses before Parent-Teacher Associations, women's clubs, and luncheon clubs on problems of child health. Such meetings have been held in a number of places in the state, and several have been arranged for in the next few months.

We are beginning also our combined obstetric and pediatric programs, with alternating talks by the obstetrician and the pediatrician, and with clinics and addresses, to the lay public, which will be inaugurated in the next month or two. The Louisville Society of Gynecology and Obstetrics is in thorough accord with these plans for the education of the public, and is cooperating perfectly with the members of the Academy.

A meeting of the leading cardiologists of the state and the pediatricians was held in Louisville to discuss a program for the children with rheumatism, organic heart disease, and chorea. The hospitals have been contacted, and a study is being made of the incidence of rheumatism, chorea and rheumatic heart disease in the larger hospitals in the state, so as to collaborate with the Children's Bureau in this phase of a crippled children's program. Incidentally, a careful examination by a trained cardiologist of the children in the public schools in Louisville revealed that about 0.33 per cent of the children in the public schools here have organic heart disease. This compares quite favorably with reports from the eastern seaboard where it appears that about 1 per cent of the school population suffers from organic heart disease.

Plans are in the making for a very careful study of a few selected one-room schools in the mountains, with the purpose in view of evaluating the relation between diet, the chemistry of the soil, and the water supply and the general progress of the children in school. These children will be carefully examined by a pediatrician, and a competent chemist will analyze the vitamin levels in the children, the vitamin contents of their diet, the deficiency in the necessary chemical elements in a limited diet, and the purity, etc., of the water. This program is being sponsored by one of the big foundations and will be a long-time study in the possibilities of the development of health and mentality by attention to the dietary needs of these underprivileged children.

A very fine spirit of close cooperation has been established between the State Department of Health, the Bureau of Maternal and Child Welfare, and the Academy members in this state.

LOUISIANA: Chairman Strong, New Orleans.—There were nineteen members of the Academy on Jan. 1, 1940. There are no other pediatricians in the state who can qualify for membership at the present time. All of those who are practicing pediatrics have been encouraged to take the examination of the American Board of Pediatrics.

The first event of pediatric interest in 1940 was a visit of Dr. John A. Toomey, of Western Reserve University, Cleveland, Ohio, who was the guest speaker in pediatrics of the New Orleans Postgraduate Medical Assembly. In addition to courtesies shown Dr. Toomey by individual members of the Academy, the Louisiana State Pediatric Society gave a banquet in his honor. This banquet was well attended, and Dr. Toomey gave a talk on some of the recent advances which

have been made in the treatment of scarlet fever. In addition, Dr. Ruth G. Aleman, President of the Louisiana State Pediatric Society, entertained at a dinner in honor of Dr. Toomey.

The next event of interest was the annual meeting of Region II, which was held on March 15 and 16, at the Edgewater Gulf Hotel, Edgewater Park, Miss. The success of this meeting surpassed the most optimistic expectations of the members of the south central part of Region II, and the cooperation of the members of Region II, who made this success possible in every way, demonstrated the traditional enthusiasm of the pediatricians of the South for the advancement of pediatrics. Furthermore, their support of this meeting may be interpreted as evidence of their loyalty to the Academy of Pediatrics in general and to their Regional Chairman, Dr. Edward Clay Mitchell, in particular. A detailed account of this meeting was published in THE JOURNAL OF PEDIATRICS, **16:** 818-819 (June), 1940. As Co-chairman of the Committee on Arrangements for this meeting, I would like to take this opportunity to express my grateful appreciation for the support of all the members who contributed to the success of this meeting.

The next important event in Louisiana was the meeting of the Louisiana State Pediatric Society, which was held in New Orleans, in April. This meeting was presided over by Dr. Ruth G. Aleman, and Dr. W. C. Riverbark was secretary. Dr. Julian Graubarth was Chairman of the Committee on Arrangements for this meeting, and he provided an interesting and instructive program. The annual banquet closed the meeting, and Dr. H. Aubrey White of Alexandria was elected President of the Society for 1940-1941. Dr. W. C. Riverbark of New Orleans was re-elected secretary-treasurer.

The members of the Academy of Pediatrics in Louisiana have given of their services freely and have acted as speakers at meetings of organizations dedicated to the conservation of health and the promotion of welfare of children. They have also responded to invitations to appear on programs of an educational nature sponsored by Parent-Teacher Associations, tuberculosis associations, and similar groups. Members have likewise contributed freely to the programs of county medical societies of the state society. In fact, the members of the Academy are in every way carrying out the principles and purposes which serve as the foundation of the American Academy of Pediatrics.

MISSISSIPPI: Chairman Garrison, Jackson.—Members in Mississippi, 10; members who are licentiates of the American Board of Pediatrics, 8; members who are not licentiates, 2; licentiates in the state who are not members of the Academy, none.

We have two new members for 1940. We have two members who are eligible for examination by the American Board of Pediatrics, and I feel that they will take the examination at a later date. Mississippi now has twelve physicians who are devoting their entire time to pediatrics. All of those who are doing so are members of the Mississippi State Pediatric Society and are active to every call for pediatric service.

We have had several fine meetings of our State Pediatric Society this year. The one on the afternoon and night before the State Medical Association meeting was an especially fine one. We had a splendid program, which was as follows:

Recent Advances in and the Importance of Hematology in Infants and Children. L. W. Diggs, Associate Professor of Medicine, University of Tennessee.

Intracranial Injury in the Newborn. Maxwell E. Lapham, Dean and Professor of Obstetrics, Tulane University.

Diagnosis and Treatment of Syphilis in Infants and Children. Joseph Yampolsky, Associate Professor of Pediatrics, Emory University.

The Premature Baby. Alfred E. Walker, outstanding practitioner of pediatrics, Birmingham, Ala.

Fellowship and Refreshment Hour, 5 to 6 P.M.

Banquet, 6:30 P.M.

Painless Labor Versus Asphyxia in the Newborn. Maxwell E. Lapham.

One of the outstanding pediatric meetings for Mississippi this year was the Region II meeting of the Academy at the Edgewater Gulf Hotel, Edgewater Park, Miss., on Friday and Saturday, March 15 and 16. This was said to be one of the best meetings of any region in the United States. Dr. Grulee was kind enough to write me and make the following comment: "It was fine to see you in Gulfport and I felt we had an excellent meeting. In fact, I think it was the best meeting Region II has ever had."

Your State Chairman wrote a personal letter himself and also induced the State Health Officer to write a similar letter to every member of the State Medical Asso-

ciation in Mississippi, urging his attendance at the Region II meeting. As a result of our extraordinarily fine program, together with our efforts to get the physicians out, we succeeded in having the largest attendance and one of the most enthusiastic meetings that Region II has ever had. If I may condescend to offer a suggestion at this point, it would be that each State Chairman pursue similar efforts to obtain better attendance from the states comprising each region, because it is only by such efforts that we will be able to get the physicians to attend the regional meetings.

Dr. Joseph B. Bilderback, President of the American Academy of Pediatrics, was with us at this meeting, and he also told me that it was the best meeting of any region that he had ever attended.

The members of the Mississippi State Pediatric Society cooperate in all health activities that are being conducted by the State Board of Health, social welfare, crippled children, and Parent-Teachers' Associations, junior auxiliaries, community welfare, and all other similar activities directed toward the health of the children in our state.

NORTH CAROLINA: Chairman London, Durham.—There are at present eighteen members of the Academy, from an available number of twenty-two. Two new applications have been sent in.

Present activities and future plans show that:

Each member of the Academy is actively associated with institutions and societies interested in the health and welfare of children in his respective community. Three Academy members are representatives of the Board of Infant and Maternal Welfare of the State Department of Health.

The Chairman addressed the pediatric section of the State Medical Society in May on "The Aims of the American Academy of Pediatrics in North Carolina." Members of the Academy took part in the postgraduate clinics given by the Board of Infant and Maternal Welfare of the State Department of Health.

A legislative committee has been set up, and legislation on the following matters is being drawn up to present to the next state legislature: (1) forbiddance of the sale of lye in North Carolina; (2) a change in the allocation of teachers of public schools on the basis of pupil days to the basis of pupil enrollment (because the present plan causes an overcrowding of children and causes overemphasis on school attendance, leading to encouragement of sick children to attend school in order to keep up the pupil-day statistics; (3) laws allowing the sale of only pasteurized milk in grade A cafes.

Newspaper articles written by members of the Academy on the following subjects have been published for lay consumption: diphtheria, neonatal care, causes of infant deaths, appendicitis, poisoning, whooping cough, diphtheria and the law, an appeal to reduce infant mortality, medical care and how to get it, use and abuse of physicians, prematurity, meningitis, pneumonia, burns, typhoid, syphilis, tuberculosis, milk-borne diseases, colds, and abscesses. These articles, after approval of the County Medical Society, are published anonymously in the local newspapers through the cooperation of the editors. Each one published has been copied in the Bulletin of the State Health Department, which is distributed throughout the state.

OKLAHOMA: Chairman Pounders, Oklahoma City.—Number of members, 11.

Committees: (1) Contact Infections, Chairman, Dr. C. E. Bradley, Tulsa, and Dr. Anna Luvern Hayes, Tulsa; (2) Child Health Relations, Chairman, Dr. George H. Garrison, Oklahoma City, and Dr. A. L. Salomon, Oklahoma City; (3) Cooperation with Nonmedical Groups, Chairman, Dr. Ben H. Nicholson, Oklahoma City, and Dr. J. B. Snow, Oklahoma City; (4) School Health and School Health Education, Chairman, Dr. Hugh C. Graham, Tulsa, and Dr. Killis C. Reese, Tulsa; (5) Camps, Chairman, Dr. Clark H. Hall, Oklahoma City, and Dr. W. M. Taylor, Oklahoma City.

There has been very little activity of the Academy as an organization in this state, but the various members have been quite actively working in cooperation with existing organizations and groups. With a small membership, such as we have, this seems to be the best way to accomplish things. The above-named committees were only recently appointed, and I believe there will be more calls for them to function during the coming year than there have been.

Some of our members have been called upon to furnish a total of four hours of teaching in each of two postgraduate courses in obstetrics and allied subjects, which have been given through the Department of Obstetrics of the University of Oklahoma. The enrollment for each course is limited to four physicians whose qualifications are acceptable to the University; the course is of two weeks' duration and is organized on highly practical lines. Other such courses are to follow.

A postgraduate course in pediatrics, sponsored jointly by the State Medical Association, the State Health Department, and the Commonwealth Fund of New

York, has been in progress in the state since Feb. 12, 1940, and will continue until Jan. 31, 1942. Earlier lectures were given by Dr. Wayne Rupe, Dr. Peter G. Davis, and Dr. Stanley Harrison, all of St. Louis. Dr. James G. Hughes is now giving the lectures and will continue until the course is finished. The number of centers where teaching has accrued to date, totals fifteen, and the total number of physicians enrolled up to now is 283, with an attendance average of 82 per cent.

The Oklahoma Commission for Crippled Children put into effect its program for taking care of cardiac diseases on April 1, 1940. The medical work is done by members of the Academy. A weekly clinic is held at the Crippled Children's Hospital, and a total of twenty-two clinics have been held to date, with 163 total visits. In addition, two itinerant clinics have been held, one at Talequah on April 16 (attendance, fourteen), and one at Ponca City on June 20 (attendance, fifteen). In addition to the regular pediatric service, eight beds have been available for boarding home care. A total of thirty-five patients have been hospitalized, and twenty-two have been given boarding home care. One hundred and thirty patients have been accepted for treatment since April 1, and of these, twenty have completed treatment, died, moved out of the state, reached maximum age, or have been found to be noncardiac.

The State Health Department is carrying out a very excellent maternal and infant welfare program in certain parts of the state. At the beginning of this year, all of the full-time county health officers of the state were brought to Oklahoma City for a five-day period, each to receive practical training in conducting well-baby clinics.

Because things have been so greatly disturbed, I feel that we have all shown some tendency to relax our interest in our pediatric organizations, but I am sure this is only temporary and that the Academy will become an increasingly important organization.

SOUTH CAROLINA: Chairman Weston, Columbia.—Aims and objects are as follows:

1. To help babies become healthier children. Protecting them from diseases by proper means of prevention, especially diphtheria, smallpox, whooping cough, typhoid. Scarlet fever prevention is optional. Schick test urged annually through the first year of school.

2. To assist children to lead active and normal lives. This group presents many behavior problems. Properly organized and administered kindergartens and play schools are advised, the one helping the other and vice versa. Schooling is realized as an essential item.

3. Youth needs advice, but rarely asks for it. Consequently an occasional newspaper article is published pertaining to such problems. Boy Scout and Girl Scout work is encouraged. Occupational guidance is the answer to this ever increasing problem.

The Committee on Camping has recently been appointed: Dr. Lesesne Smith, chairman, and Dr. R. M. Pollitzer and Dr. William Weston, Jr.

Crippled Children.—The effort to include in this group ailments which are just as crippling as bony disturbances, such as rheumatic fever, arthritis, cardiac diseases, tuberculosis, leucemias, nutritional anemias, etc. There is close association between the Crippled Children's Division and your State Chairman.

The Department of Maternal and Child Health in this state does not seek advice from the Academy members.

Traffic Care: Helping drivers and children to become car (automobile) conscious. Adults are supposed to think; we know children act on the spur of the moment.

It is the perseverance and assistance of the pediatrician which will eventually make the public pediatric-minded. Let us, the members of the American Academy of Pediatrics, be big enough to carry on for those who are not members.

Suggestion: A few concrete ideas should be developed and completed, as opposed to a conglomerate undertaking.

TENNESSEE: Chairman Jacobs, Memphis.—Dr. Grulee called my attention to the fact that there had been complaint about the administration of the Crippled Children's Act in several states, and I was requested to investigate the facts in Tennessee. I soon discovered that practically all money available for the administration of that act was spent for hospitalization and for remuneration of a number of orthopedic surgeons employed in this work, and that no remuneration whatsoever, as far as I could find, was accorded any pediatrician. This led to an extensive correspondence with the Commissioner of Public Health of Tennessee, and to two meetings between him and myself. He repeatedly expressed himself as favoring participation of pediatricians in this work, and as desiring the opinion of pediatricians regarding examination pediatric care, remuneration, etc., in connec-

tion with this work. So far, it has not been possible to achieve any result whatsoever with him, although I had the assistance of the other Chairman from Tennessee, my esteemed colleague, Dr. Casparis. The outstanding objection advanced by the Commissioner was insufficient funds for the purpose, as voiced by him in his last letter: "We do hope that in time the plan can be worked out in accordance with our previous discussions. At the moment, however, all we can do is hope."

Eight orthopedic surgeons in western Tennessee each receive $50 a month, and, in addition, $25 for each clinic held.

I also appointed a committee of five to study a workable program for contact infections in Tennessee, and these men have been endeavoring to get tangible results.

More recently, our time has been largely occupied with activity relating to the November meeting of the Academy in Memphis. As Chairman of the Committee on Publicity, I have been active in the construction of three communications to the members in connection with the meeting.

The Memphis Chamber of Commerce graciously assisted in the preparation of and the expense of printing, stamping, and mailing these letters. At the time that I write this, there has been a most liberal and gratifying response of the membership, as shown by the large reservation of rooms, many letters of inquiry, and manifestation in many other ways of great interest in our coming Convention.

TEXAS: Chairman Schwarz, Fort Worth, and Chairman Reading, Galveston.—The membership of the Academy has been active in the pediatric activities over the state, but no definite program for the Academy alone has been inaugurated. Membership in the various state committees, as selected the previous year, has been continued as heretofore.

The Texas Pediatric Society, an organization of over 100 pediatricians, has been active in the separation of the Section of Medicine and Diseases of Children in the State Medical Association and the inauguration for the coming year of a separate Section on Pediatrics. Dr. F. H. Lancaster, Dr. T. A. Tumbleson, and Dr. David Greer, all members of the Academy, have been most active in this work.

The two State Chairman are members of the Committee on Publicity and Contact Infections of the Texas Pediatric Society, and the Committee has edited an approved program of health education to be disseminated throughout the state. Dr. L. O. Godley is the pediatric representative on the State Board of Health and has been most active in the fulfilment of his duties. One of the State Chairmen is the pediatric representative on the technical advisory board for the state crippled children activity.

The various members have received circulars at frequent intervals, concerning the activities of the Academy, and have been urged to take part in the activities and the program.

VIRGINIA: Chairman Stone, Richmond.—The twenty-one members of the Academy in Virginia have continued to use their influence in the promotion of better child health. As in the past, their activities have been largely through the medium of other organizations. Of the nine members of the Child Welfare Committee of the Medical Society of Virginia, six are Academy members. The Committee has kept in touch with the Bureau of Maternal and Child Health of the State Department of Health, and on occasions has conferred with members of the Bureau in its program of bettering child health conditions.

The infant mortality rate of 59.7 per cent is still regrettably high, but compares most favorably with the rate of 77.5 per cent in 1929. The Committee has suggested that a study of the causes of infant and child mortality and morbidity be made by the component societies of the State Medical Society in their respective localities, to the end that improvement in the situation may be brought about. Four new county health departments are being formed, and this means the extension of maternal and child health work in these counties. This work will then be established in fifty counties of the state and will include approximately 60 per cent of the rural population. It is believed that only with well-organized county health units can effective maternal and child health work be developed. There are now in operation in the state thirty-six well-baby clinics, in addition to seventy clinics for mothers and babies. The latter clinics also take preschool children. During the past year there were 17,000 well-baby clinic visits and 13,000 preschool clinic visits. A number of new clinics are now in process of organization and will soon be opened. These clinics are run by the local physicians under the administrative supervision of the State Health Department.

At the present time, the Bureau of Maternal and Child Health is working on a state-wide program for better care of premature babies. This plan, when put into operation, gives promise of being an important factor in lowering the mortality of these babies.

The number of deaths from diphtheria in 1939 was slightly above that of 1938. Free distribution of toxoid has been urged by the Child Welfare Committee, but its efforts failed to get an appropriation for that purpose by the last legislature. However, as the result of educational campaigns, the number of children receiving the preventive inoculations has increased yearly. During the first seven months of 1940, the incidence of diphtheria was approximately 25 per cent less than for the corresponding months of 1939. Effort is being made not only to have all infants receive toxoid, followed by a Schick test, but to have the Schick test repeated just before the child enters school.

During the past year a forty-bed "preventorium" for negro children was established at one of the state tuberculosis sanatoria. Forty-beds for white children are available at another state sanatorium. In municipal sanatoria there are seventy-six beds for white children and fourteen for colored. The representatives of the Academy feel that the "preventorium" treatment could give away advantageously to the care of actively tuberculous children in sanatoria, and that the care of exposed children not yet shown to be actively tuberculous should be left to the family physician or other local medical authorities.

Although the Child Welfare Committee has recommended compulsory chest x-ray examinations of teachers in the public schools, such a requirement is not yet in effect. However, in certain local communities such examinations are being carried out voluntarily.

The State Department of Education has taken steps to discover more effectively the hard-of-hearing children in the public schools by means of a group audiometer, to the end that those with defective hearing may be given suitable care.

The mental hygiene program, as formulated and approved by the Medical Society of Virginia, was presented at the last meeting of the legislature, but due to unforeseen factors, was defeated. Consequently, the situation remains unchanged, and in the opinion of the Child Welfare Committee the problem is being met very inadequately. However, the legislature did direct the Virginia Advisory Legislative Council to "make a thorough investigation and study of the problems now existing in Virginia relating to children and child welfare, including custody, placement, and foster home care of, and other matters affecting delinquent, dependent, defective and neglected children, the adequacy of the present facilities for providing such services, and the possibility and best methods for improving the state's program for the care of such children." The findings of the council, together with recommendations and suggested legislation, are to be submitted to the Governor at least thirty days prior to the next regular session of the General Assembly.

The Virginia Pediatric Society dispensed with its usual clinical meeting in the spring, in view of the meeting of Region I of the Academy in Washington at that time. At its meeting on July 29, there was a round table discussion on "Urinary Tract Infections in Childhood," led by Dr. Ralph Tyson of Philadelphia.

The motion picture, "When Bobby Goes to School," dealing with the examination of the preschool child and sponsored by the Academy, was shown daily during the joint meeting of the Virginia and West Virginia State Medical Societies in July.

The usual spring and fall postgraduate clinics have been held at the University of Virginia and the Medical College of Virginia, respectively, under the joint sponsorship of these medical schools and the Department of Clinical and Medical Education of the Medical Society of Virginia.

The Virginia General Assembly, at its last session, passed a law, going into effect July 15, 1940, that provides for licensing, regular inspection and supervision of health and sanitary conditions of summer camps by the State Health Department. The Health Department has certain minimum required standards which must be met by the camps, and, in addition, recommends certain measures considered desirable though not required.

WEST VIRGINIA: Chairman Blanton, Fairmont.—Three additional Fellows have been added to the membership of the Academy from West Virginia during the past year. These men are doing excellent work in pediatrics, and we welcome them to participation in Academy activities, both local and national.

Some progress has been reported by the various state committees, although no definite state-wide program has been initiated as yet. The most important development has been the examination, including x-ray of the chest, of all teachers and janitors in the public schools of several of the counties of the state, and it is confidently expected that the program will become state-wide. The teachers are also becoming much more cooperative in their conduct of morning inspections as a vital part of the health program in the schools.

Educational work along the line of contact infection in the home is also receiving some attention, and examination of domestic servants is being required more and

more frequently by parents of young children. So far, parents have been assuming the expense of these examinations.

West Virginia has experienced an epidemic of poliomyelitis during the last two months. New cases are still being reported from a few sections of the state. The Academy participated in a move to provide pediatric and orthopedic consultations, as well as orthopedic nursing care, for all needy cases through the Department of Public Assistance. This provision of care during the acute stage of the disease should save the state many dollars. We are very fortunate in having a Director of Public Assistance who could grasp the importance of expert supervision during the acute illness to prevent the development of unnecessary deformities arising from no care or unwise care.

The Virginia Medical Association met with the West Virginia Medical Association at White Sulphur Springs the last of July. The joint meeting of the pediatric sections of the two associations was well attended and very instructive. Everyone expressed a desire for a repetition of the joint meeting some time in the near future. The West Virginia Academy members were hosts to the Virginia members and their wives at a cocktail party one evening during the meeting, providing an hour of good fellowship for those present.

In closing, I wish to thank the State Chairmen and the members for their loyal support.

I am sold on the Academy and have been since its conception. I will again repeat, the Academy will never attain the result that it can unless every member works; and the duties of the officers and the State Chairmen should be to see that every member is given a task suitable to him.

Respectfully submitted,
EDWARD CLAY MITCHELL
Regional Chairman

Report of Region III

During the past year there has been a continued increase in the activities of the state groups. In each state, committees have been set up to carry out the work and suggestions of the national committees of the Academy. In practically every instance these committees have been able either directly or indirectly to carry out the recommendations and suggestions which have been proposed by the national committees of the Academy.

In **Illinois,** the Committee on Child Health Problems has been very active in cooperating with the various groups which work with children. In this state, also, a committee to institute a program for the care of mentally handicapped children has been very active. The Committee on Children's Hospitals and Public Domiciles is making a survey of all the Children's Institutions in the state, for the purpose of determining the type of physical equipment in these institutions, the qualifications of the personnel, and the provisions made to protect the children against contact infection.

In **Minnesota,** the members have arranged for the State Medical Society to appoint a major committee on child health, and the membership of this is to be largely made up of members of the Academy. They have also been working on a program of tuberculosis control, as outlined by Dr. C. A. Stewart.

In **South Dakota,** because of the small number of members, the Academy has had to work largely through the existing organizations and groups. However, they have been able to control in a large measure the programs relating to child health through membership on committees of the State Society.

In **Missouri,** they are continuing the excellent work which has been going on for some time and are attempting to increase their influence in the various groups interested in children, both by cooperation and by obtaining membership on these committees in other organizations.

Nebraska is to be congratulated since it has a 100 per cent membership in the Academy of all eligible pediatricians. The men in this state are very active and control to a very large degree all of the groups that are interested in child health since they hold key positions on practically every committee that has to do with this type of work.

In the remaining states which make up the Region, activities are being carried out similar to those already mentioned, and it is gratifying to see the enthusiasm which is being manifested by the entire membership of the Region.

The annual meeting of Region III was held at Kansas City, Mo., on May 16, 17, and 18, 1940, at the Hotel Muehlebach. The total attendance at this meeting was 325, made up of 115 members, 110 visitors, 70 women, and 30 commercial exhibitors. The expense of the regional meeting was as follows:

Disbursements:		
Printing and mailing of publicity concerning meeting to members	$ 326.22	
Preparing and printing programs, including correspondence concerning program	182.21	
Exhibit expense	291.89	
Expense of meeting	1,210.51	
Expense of committee on arrangements, including postage, telegrams, office supplies, etc.	174.15	$2,184.98
Total Receipts:		
Receipts from exhibitors	$1,241.50	
Printing and postage refund from Hotel Muehlebach	26.32	
Sale of tickets to members	1,159.00	2,426.82
Balance		$ 241.84

At the business meeting of Region III, held in conjunction with the annual clinical meeting, the topic of importance discussed was the status of the state of Missouri. There was a request from Region II to the Executive Board that Region III permit the state of Missouri to transfer to Region II. The matter was thoroughly discussed in an open meeting, and it was the consensus of opinion that the final decision would have to be made by the membership of the state of Missouri. However, the feeling was expressed unanimously that Region III would be very loath to lose the state of Missouri because of the association which began with the Old Central States Pediatric Society. At the meeting of the State Chairmen, the question of financing the regional meeting was brought up, and it was decided that the regional committee would continue to handle all arrangements, including financing, as had been done for the meeting at Kansas City.

Dr. Martmer resigned as Chairman of the Regional Committee on Arrangements, and Dr. Wishropp was appointed Chairman in his place.

The next annual meeting of Region III will be held at the Palmer House in Chicago, May 15, 16, and 17, 1941.

Respectfully submitted,
A. GRAEME MITCHELL
Regional Chairman

Report of Region IV

The annual regional meeting of Region IV was held in Seattle, Wash., May 30 and 31 and June 1, under the general direction of the newly appointed State Chairman Frank Douglass. The Fellows in Seattle arranged a program of great interest and provided for the comfort, convenience, and pleasure of the visiting members in the manner which apparently characterizes the gracious hospitality of the Northwest. The scientific program has been reported heretofore in detail. Despite the distances involved in travel, nearly two-thirds of the membership was in attendance, and many invited guests swelled the total attendance to approximately 250. From without the Region, Dr. Henry Helmholz, Dr. Franklin P. Gengenbach, and Secretary Grulee were in attendance.

The next regional meeting is to be held in San Francisco, May 1, 2, and 3, 1941, under the general chairmanship of Crawford Bost. The opening day will consist of clinics arranged by Harold Faber of Stanford University Medical School and by Francis S. Smyth of the University of California Medical School. The formal scientific program, meeting of State Chairmen, and annual banquet will fill the two final days.

The Region highly approves the custom of having the President as the guest of honor; this year it was exceptionally pleasant to be able thus to do honor to a President from our Region, who stands high in the respect, and most especially in the affection, of every member.

Reports have been received from nearly all the State Chairmen. The following are excerpts from these reports:

ARIZONA: Chairman Tappan, Tucson.—There are four members in the state, three practicing pediatricians are eligible for the American Board of Pediatrics' examination and later membership in the Academy. Projects originating in the Academy have been referred to the Arizona Pediatric Society, organized in 1939 and restricted to those who practice pediatrics predominantly. The total membership of this body is fourteen. Officers for 1940 include Vivian Tappan, president, and

Hilda Kroeger, secretary. The following projects have been in operation for the past year:

1. Well-Baby Clinics.—Directed by members of the Arizona Pediatric Society, financed in part by federal and state aid. Hugh Thompson, Fellow of the Academy, is representative on the executive committee for child and maternal welfare.

2. Pediatric examinations and care of children admitted to crippled children's service. A representative of the Arizona Pediatric Society, E. Charvoz, is on the executive committee.

3. Committee on Contact Infections: Chairman H. Kroeger, B. Storts, W. S. Sherrill, and V. Tappan.

4. Committee on Postgraduate Instruction: Acting Chairman, Vivian Tappan. With the cooperation of the Division of Child and Maternal Welfare, Dr. Charles F. McKhann was invited to give a three-day series of lectures and discussions at the Arizona State Medical Meeting in April, 1940. During 1940-41 a similar course of lectures is being planned, and the Arizona Pediatric Society hopes to invite a pediatrician of note to address its members during the winter season.

5. Pediatric care of all children in public institutions.

6. Pediatric consultations in rural communities, well-baby clinics, crippled children's clinics.

The especial project for this state for the current year is the control of contact infections, there being many reasons for this special interest. For this purpose, the Committee on Contact Infections has attempted a campaign of publicity and education for physicians, public health workers, and laymen.

CALIFORNIA (Southern): Chairman Stork, Los Angeles.—State Committees were appointed last November on Contact Infections, Child Health Relations, Cooperation with Medical Groups, and on School Health and School Health Education. These cooperate with the national committees of the same titles. Because each committee is composed of members from both Northern and Southern California, the activities are somewhat hampered by the necessity for correspondence, but we plan to have meetings and reports before long.

The local group has interested itself this year in the appointment of a certified pediatrician as Director of the Department of Health of the Los Angeles City Schools, has brought some pressure to bear on the Board of Education, and hopes its efforts will bear fruit.

CALIFORNIA (Northern): Chairman Sweet, Oakland.—Has maintained an extremely active interest in the work of the State Bureau of Child and Maternal Welfare which is under the direction of Ellen Stadtmuller, a member of the Academy. Dr. Sweet, Dr. Stork, Dr. Reiss, and Dr. Shaw serve on the professional advisory committee of this bureau.

The Committee on Contact Infections, headed by Edith Meyers, has made especially excellent progress in the organization of this work in Oakland and Alameda County. The program is shortly to be presented to the county medical society. In conjunction with the local tuberculosis association, arrangements are being made to examine and x-ray all domestic help, and it is believed that an ideal system is rapidly being developed.

Recently Dr. Phillip C. Jeans was the guest of the members in the vicinity of Oakland and presented two days of lectures and discussion which was enjoyed by numerous members and others.

IDAHO: Chairman Tremaine, Boise.—There are only two members in this state, but these are extremely active in attendance at regional and national meetings and in the dissemination of the policies of the Academy in the child health program of Idaho.

MONTANA: Chairman Joesting, Butte, is the only member in the state. Dr. Joesting reported at the meeting in Seattle.

NEVADA: Chairman Brigman, Reno.—Your State Chairman is Chairman of Washoe County Citizens' Child Welfare Committee which: (1) helped put through the legislature a licensing law for boarding homes; (2) expects to secure adoption by the legislature of a measure providing aid to dependent children under the Social Security Act; (3) worked two years on a state adoption law copied after the California statute; (4) cooperates with the state representative of the White House Conference on Children in a Democracy; (5) had twenty-two candidates appear at its meeting before primary election to state their views on various laws relating to children and health.

The Chairman is a member of the Washoe Chapter International Infantile Paralysis Foundation. This chapter works with the State Board of Health and raises and spends the money to care for the children classified as cripples. We hold clinics for these children who are examined by a pediatrician previous to the orthopedic examination.

In cooperation with the Board of Health, we have a pediatrician, or a general practitioner who has had a recent refresher course in pediatrics, conduct well-baby clinics.

The Children's Department of Washoe General Hospital is headed by Roland Stahr, who is a newcomer to this state.

NEW MEXICO: Chairman Wylder, Albuquerque.—Due to our limited numbers, our state activities have mostly consisted in helping out other medical societies. In May, Dr. Adler, Dr. Warner, and I held a pediatric round table in Gallup, N. M. All but one member of the McKinley County Medical Society were present.

Dr. R. L. Jackson of the Department of Pediatrics, Iowa State University, has been in New Mexico giving refresher courses throughout the state.

Most of the pediatric activities have been carried out by the Department of Maternal and Child Welfare, and the Academy members have done all they could to further this program.

OREGON: Chairman Rosenfeld has been succeeded by **Carl G. Ashley, of Portland.**

UTAH: Chairman Smith, Ogden.—As in the past, on account of our limited membership in the state, the work of the Academy has consisted largely in cooperating with other agencies along the lines of child welfare. Of ourselves, however, we have arranged for a group of pediatricians who may be called upon by any medical group in the state for round table discussions of pediatric subjects. This attempt at teaching has proved to be of considerable benefit and interest to the groups visited, as well as to the men who put on the program.

Joint Committee for the Study of Maternal and Neonatal Mortality.—Two of our members are represented on this committee which is a joint one representing the State Medical Association, the Academy of Pediatrics, and the State Board of Health. We are making an intensive study of these subjects in this state and feel that a great deal of valuable information is being obtained. An exhibit of some of the findings of the Committee attracted considerable attention at the recent State Medical Association meeting.

The United States Children's Bureau, in cooperation with the State Board of Health, is establishing a program for the care of cardiac cases. One area in the state has been set aside for this work and a member of the Academy placed in charge. The Academy is also represented on the technical advisory committee of the State Board of Health by having one of its members as Chairman.

While we cannot claim to have initiated any of these programs for child care, we feel that we have been able to place our members in strategic positions in existing organizations, where, no doubt, they will be able to accomplish a great deal.

WASHINGTON: Chairman Douglass, Seattle.—Two members on the State Medical Association Board of Trustees. Chairman of the State Medical Association Committee on Group Hospitalization. Four members on State Medical Association Committee on Maternal and Child Health. One member on State Medical Association Committee on Public Health and Sanitation. Cooperate with North Pacific Pediatric Society and the State Board of Health. Control child welfare clinics of Seattle City Health Department.

HAWAII: Chairman Palma, Honolulu.—I think it is sufficient to say that we have three members and a fourth person who will qualify soon and that between us we continue to promote the best type of pediatrics and the various projects of the Academy that have to do with the welfare of the child in this community. We are all active on the different committees of the Board of Health and in the Medical Society that are concerned with these activities, and the medical profession goes along pretty well with our advice. Speaking as an individual as well as the State Chairman, I feel tremendously indebted to the Academy, with its various committees for guidance and leadership. It gives direction and coordinates our activities, which is of the greatest help here in our somewhat remote locality with its peculiar local conditions.

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From the State Chairmen in Canada, Douglas B. Leitch for Alberta and Alfred H. Spohn for British Columbia, no reports have been received, but it is hoped that their report at our next regional meeting will provide an intimate exposition of what war means to pediatrics and to the pediatrician.

The Region of the West is a far-flung empire which presents general problems different from many other parts of the country and a multitude of problems peculiar to each state, province, and territory represented. The Regional Chairman sends his greetings to each State Chairman, together with his sincere thanks for the continued cheerful cooperation which is his to enjoy, and looks forward to greeting the Chairmen and all the members in the next regional meeting in San Francisco.

Respectfully submitted.
EDWARD B. SHAW
Regional Chairman.

Reports of Special Committees

Report of the Committee on Central and South American Scholarships:

The Committee has been able to secure six scholarships which are being granted by the following firms and institutions: Abbott Laboratories, Mead Johnson & Co., Quaker Oats Co., and Foundations at the University of Cincinnati, the University of Chicago, and the University of Minnesota. The following medical schools and hospitals have signified their willingness to accept scholars: University of Chicago, Children's Memorial Hospital, Chicago, University of Cincinnati, Columbia University, Harvard University, Johns Hopkins University, University of Iowa, Mayo Foundation, University of Minnesota, Western Reserve University, and Yale University. Scholars will be awarded to candidates from the following South and Central American Republics: Argentine, Brazil, Chile, Cuba, Mexico, and Uruguay. The Secretaries of the national pediatric societies of the various countries have been sent information regarding the scholarships, and it is hoped that all six scholars will begin service next fall.

Respectfully submitted,
HENRY F. HELMHOLZ, Chairman
A. GRAEME MITCHELL
FRED W. SCHLUTZ

Report on the Child Health Record From Infancy to Adulthood:

The American Academy of Pediatrics has published a booklet entitled "Child Health Record From Infancy to Adulthood." This was prepared in cooperation with, and for the benefit of, the American Legion, as well as the Academy members and their patients. It has been said that the Legion is to publish and distribute this Record on the basis that it may be of benefit to national defense by developing a healthier army for the future. The Health Record was developed as a result of inspiration from Dr. Grulee and Dr. Stanley Nichols. Additional assistance in its preparation has been obtained from Dr. Richard M. Smith, Dr. E. C. Mitchell, Dr. Harold Mitchell, Dr. L. W. Hill, Dr. Clifford Sweet, and Dr. George Lyons. Dr. Harold Stuart prepared the graph for height and weight, based on the work of Dr. Howard V. Meredith, University of Iowa. The dental record is from the American Legion, submitted by Dr. Earl C. West of Mora, Minn. We trust that the use of this Child Health Record will justify expectations.

Respectfully submitted,
FAIRFAX HALL

Report of the Committee on Child Health Relations:

The child health relations program of this Committee, which has for its objective the making of each State Fellowship of the Academy the principal advisory group for the State Departments of Health and other official state agencies, the State Medical Societies, and the lay agencies having child health programs, is making steady progress in most of the states.

Child health relations committees have been appointed in all forty-eight states, the provinces of Quebec and Ontario, and the territory of Hawaii. In one, the State Chairman has been requested to act as such committee, because there are insufficient Fellows to serve on a separate committee.

Questionnaires were sent to all State and Province Chairmen of Child Health Relations Committees, requesting detailed information as to the progress of the program on each of the six points embodied in the program. To date, complete reports have been received from thirty-two states and provinces, which give a very interesting and encouraging picture of the progress of the program.

This factual material and the improvement of the program itself will be carefully considered at a meeting of the Committee on Child Health Relations at Memphis, on Nov. 18, 1940, from 5 to 7 P.M., and at a meeting of the Committee, State Chairmen, and committees which will follow from 7 to 9 P.M. This four-hour conference will have considerable value in the forwarding of the program as a whole, both national and in the several states and provinces.

The questionnaires so far received show that many of the State Medical Societies have Child Health Committees, or as a result of Academy activities, are establishing them now or in the near future.

In many of the states, the Academy Fellows are the Child Health Committee of the State Society, or comprise a majority of the Child Health Committee members.

Most of the Chairmen wish the President of the Academy to suggest to the President of their State Medical Society and to State Health Commissioners that the Academy Fellowship would be glad to be of service in the development of Child Health activities within the state.

In over one-half of the states reporting, there are close advisory, consultant, or other activities by the Fellowship in relation to the State Bureaus of Maternal and Child Health, and in a little less than one-half the State Fellowship is functioning as the stimulating and coordinating link or liaison between the child health activities of the State Department of Health and State Medical Societies. The majority of the reports show consultant, advisory, or other actvities of the Fellowship in relation to agencies other than State Departments of Health and Medical Societies.

In a minority of the states reporting is there a merit system in the health departments as to medical and other health personnel.

Many suggestions for improvement of the child health relations program have been received and will be considered at the meeting of the Committee in Memphis.

When all of the state reports have been received, more definite detail as to percentages and conditions in the various states will be abstracted and presented in a subsequent report of the Committee.

The impression gained by a study of the thirty-two reports received is that commendable progress has been made as to the objectives of the program, and a considerable amount of further activity is being developed for the immediate future.

An added step forward in the matter of our Fellows assisting State Health Departments' child health programs has been afforded by the request of the Children's Bureau (through Dr. Martha Eliot, Assistant Director, and Jessie Bierman, Assistant Chief of the Division of Maternal and Child Health) that our State Fellowships, working through the State Chairman of the Child Health Relations Committee, assist the State Health Departments in the matter of improving the quality of pediatric service rendered in the 3,000 child Health Conferences being held in the United States. During the winter, Dr. Bierman addressed a letter to the Chiefs of the Bureaus of Maternal and Child Health in each state, setting forth our willingness to have the state Academy Fellows, when so requested, assist State Health Departments to improve the quality of pediatric service rendered in the Child Health Conferences, the Fellows to be reasonably compensated according to the service rendered.

Up to the present time, seventeen Chiefs of the Bureau of Maternal and Child Health of State Health Departments have replied to Dr. Bierman that they would welcome such assistance, and a letter has gone out from our Child Health Relations Committee to the Chairmen of the Academy State Child Health Relations Committees, requesting that they get in touch with the Chiefs of the Bureaus of Maternal and Child Health in those states, and make suitable arrangements for the cooperation of the Academy Fellowship on this valuable program of improving the quality of pediatric service rendered the children attending the Child Health Conferences.

This definite program, as it expands, is, in our opinion, excellent groundwork for the establishment of a very real cooperation of our Academy Fellowship with the child health programs of the respective State Health Departments, and our committee is happy to be of assistance to the Children's Bureau and the State Health Departments in this respect.

At the present writing, one state, New Jersey, has this program in actual operation, and twenty-eight Fellows of the Academy are making regular visits (for which they receive compensation) to the seventy Baby-Keep-Well Stations of the state, acting in a consultant and advisory capacity to the physicians in charge of the stations, with a definite object of improving the quality of pediatric service rendered in these child health conferences. In both New York and Connecticut preliminary plans have been made along the same line, and in some of the other regions there is a great deal of interest in setting up a similar type of activity.

This concrete demonstration of willingness of our State Fellowships to be of service to State Health Departments has not only promoted working relationships between pediatricians and State Health Departments, but will undoubtedly lead to further development of fields of usefulness for Academy members, which will be a threefold benefit to the Health Departments, to the pediatricians themselves, and most of all, to the children, by improving the quality of pediatric service they will receive through increasing the participation of pediatricians in all types of child health services.

During the past year the sound foundation of our program has been strengthened, and steady progress is being made toward the six objectives of our Committee.

Respectfully submitted,
STANLEY NICHOLS, Chairman
PHILIP F. BARBOUR
W. L. CRAWFORD
MARTHA M. ELIOT
GEORGE M. LYON
OSCAR REISS

Report of the Committee on Contact Infections:

The Committee on Contact Infections has continued to emphasize the necessity of proving the absence of contagious conditions in all persons closely associated with young children.

In addition to nursemaids, schoolteachers, and parents, for whom periodic health examinations have been urged, attention of the members of our subcommittees in the states has been called to the findings of the Committee on Hospitals and Dispensaries, on health examinations of the medical and nursing staff and ward attendants in all hospitals caring for children. It is desirable that we cooperate in regard to raising the standard of these examinations, particularly with the idea of excluding all adults who have active tuberculosis from contact with children in hospitals.

We have called the attention of the subcommittees to the use of the miniature 4 × 5-inch film lung x-ray. Once the apparatus is installed, each exposure can be made for less than ten cents. Wherever this method for diagnosis of tuberculosis is made available, its use will be widespread.

We have advocated the lung x-ray of all mothers during pregnancy to exclude the possibility of tuberculosis which may become infectious for the child.

The Committee has continued to keep in touch with tuberculosis associations and other organizations interested in protecting the health of children by early discovery of tuberculosis in all adults with whom they are in contact.

The Committee hopes to continue its activities in other directions for the prevention of primary and reinfection tuberculosis in children.

Respectfully submitted,
FAIRFAX HALL, Chairman
GAYLOR W. GRAVES
REGINALD A. HIGGONS
PARK J. WHITE

Report of the Committee on Cooperation With Nonmedical Groups and Societies:

Your Committee submitted a detailed report of its activities to the Executive Board last May. This report was published in full in the June issue of THE JOURNAL of PEDIATRICS. The present report may be quite brief, since the status of its program is essentially as in the published report.

The Committee's entire efforts have been confined to its cooperative project with the National Parent-Teachers' Congress. This project is a joint activity to increase the quantity and improve the quality of periodic preventive examinations for the children of America. In working toward this objective, a three-point program has been arranged.

1. Subcommittees have been established in every state in the nation.

2. A sound motion picture entitled "When Bobby Goes to School' has been filmed for the Academy and is being distributed by Mead Johnson & Co. This film has been shown before all the regional meetings of the Academy except that of Region II. It was shown before the pediatric section of the American Medical Association at New York in June. It has also been shown before a number of state medical meetings and before many other professional and lay groups. The film is excellently done and outlines clearly the various procedures leading to a thorough appraisal of a child's health. To be of greatest value it needs to be shown before many more audiences, including physicians who will examine the children and parents who have the children to be examined. All state subcommittee chairmen were notified during the summer of the film's completion, of its availability for distribution, and of the rules which have been set up governing its distribution. Unfortunately, your Committee is unable to express an opinion at the present time as to how well this phase of the work has been progressing in the various states, since so few replies have been received to its request for report of progress from State Chairmen. At the Memphis meeting opportunity will be had for bringing the matter up for discussion before the entire personnel of the state committees, and it is hoped greater activity along this line can be stimulated.

3. A brochure is being prepared which will outline in detail the procedures which the physician needs to know in performing a thorough health assay of a child. The brochure is in process of preparation, and it is hoped it may be ready for submission for criticism to the state subcommittees at the meeting with the national committee in Memphis in November. It is the Committee's present plan to endeavor to have the brochure printed in pamphlet form in such numbers that copies may be distributed among physicians whenever the motion picture is shown before professional audiences.

Your Committee feels that its preliminary work, largely organizational, is nearly completed. It realizes that an even harder and longer task lies ahead—that of

making the program function. But with the cooperation of its state subcommittees and of the Academy members in general, it is confident much can be accomplished to stimulate interest in this important phase of child health.

Respectfully submitted,
LEE FORREST HILL, Chairman
DENNIS H. KELLY, Secretary
C. A. ALDRICH
JAMES W. BRUCE
JOSEPH A. JOHNSTON
ALBERT D. KAISER
MARGARET NICHOLSON
WARREN SISSON
HENRY E. UTTER

Report of the Committee on Medical Supervision of Camps:

The Committee on Medical Supervision of Camps held its first meeting in full attendance at the annual meeting of the Academy in Cincinnati last November. The Committee was unanimous in recognizing the great opportunity for the application of known medical knowledge to the general health of campers. It was quite obvious that we, as a Committee, were not entirely familiar with the intricacies of summer camp organizations and must devote considerable time in a preliminary way to obtain firsthand knowledge of the camping situation as it exists throughout the United States. Members of the Committee during the past year have been active in local groups, and new ideas for activities are being formulated.

It was clearly the consensus of opinion of the Committee that our efforts should be directed toward the medical supervision of the so-called organizational, or nonprofit, camps. This group represents the largest number of children.

The activities of the Committee have consisted of the compilation of so-called minimum health standards for camps. These have been published by the Academy and distributed to State Chairmen and many of the organizational camps. Experience has shown that the standards are acceptable and practical for some camps, but less adaptable to others. We feel that considerable has been done, however, to stimulate a real interest in the health of children in summer camps.

The Committee has been concerned in regard to the difficulty in contacting camps throughout the United States. Although the American Camping Association has been most cooperative, all camps are not affiliated with this organization. Efforts are being made to solicit the cooperation of the State Chairmen to formulate local camp councils through which the Committee can function.

Last year mention was made of the necessity of investigating the statutes of all the states in regard to legislation for summer camps. Dr. Henry E. Utter is still working on this very complicated and important subject. His report will be available in a short time, together with recommendations for adequate state legislation for the medical supervision of camps.

The Camp Committee has asked Dr. Lloyd B. Sharp, head of the Life Camps and chairman of the committee of the American Camping Association for cooperation with medical organizations, to meet with us this year at the Memphis meeting to discuss medical needs of camps.

Respectfully submitted,
WARREN SISSON, Chairman
W. L. FUNKHOUSER
ROGER L. J. KENNEDY
VERNON W. SPICKARD
HENRY E. UTTER

Report of the Committee on Cooperation With the Pediatric Section of the American Medical Association:

The Liaison Committee for the American Academy of Pediatrics and the American Medical Association is pleased to report that it has had no conflicts in the purposes of the two associations. However, we wish to urge strict cooperation and loyalty of both the Section on Pediatrics of the American Medical Association and the American Academy of Pediatrics, to the end that we may be better pediatricians and render a more glorious service to our patients.

Respectfully submitted,
HARVEY F. GARRISON, Chairman
HUGH L. DWYER
ALBERT D. KAISER

Report of the Committee on Honorary Fellows:

No further recommendations.

Respectfully submitted,
KENNETH BLACKFAN, Chairman
ISAAC A. ABT
RUSTIN MCINTOSH
EDWARDS A. PARK

Report of the Committee on Hospitals and Dispensaries:

The Committee hoped to have available at this time a report on facilities for dental care in the outpatient departments of children's hospitals in this country and Canada. Preparation of this questionnaire has been delayed, but it is expected that it will be in the mail shortly after the meeting in November. A full report on the information received from the questionnaire will be made.

Respectfully submitted,
GEORGE F. MUNNS, Chairman
JOHN A. BIGLER, Secretary
MURRAY H. BASS
LAURENCE R. DEBUYS
CLIFFORD G. GRULEE
LEWIS WEBB HILL

Report of the Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases:

The revised edition of the pamphlet "Report of the Committee on Immunization and Therapeutic Procedures for Acute Infectious Diseases, and on Biologicals" has been sent out to the Fellows of the Academy.

Respectfully submitted,
JOHN A. TOOMEY, Chairman
HORTON CASPARIS
E. J. HUENEKENS
CHARLES MCKHANN
BÉLA SCHICK
EDWARD B. SHAW

Report of the Committee on Infantile Paralysis:

On Sept. 25 and Nov. 7 and 8, 1940, there will be meetings of the Educational Committee of the National Foundation for Infantile Paralysis in New York, and it is possible that further reports can be given to you.

Respectfully submitted,
A. GRAEME MITCHELL, Chairman
D. LESESNE SMITH
JOHN A. TOOMEY

Report of the Committee on Legislation:

The Committee on Legislation would report that no matters of importance have been considered by the Committee since its last report to the Executive Board on April 20, 1940, in which it was stated that the resolutions adopted by the Academy in November, 1939, relating to the National Health Bill, had been presented to the Chairman of the Subcommittee on Education and Labor of Congress.

Respectfully submitted,
JOSEPH S. WALL, Chairman
ISAAC A. ABT
JAY I. DURAND
PHILIP VAN INGEN
ALFRED A. WALKER

Report of the Committee on Medical Defense and Relief:

A report of the work of the Committee on Medical Defense and Relief, appointed last July, to which matters related to the present emergency were referred, appears on page 419 of the September number of THE JOURNAL of PEDIATRICS, and page 570 of the October issue. As the work was of current interest and involved so many members of the Academy, it was decided to publish a current report under "Academy News." There is no need, therefore, of reprinting past details.

Several hundred unspecified children have reached New York City, to be under the auspices of the United States Committee for the Care of European Children. These youngsters were brought over on British ships, some of them by way of Canada. No American ships have been sent. Many of these children were kept

in New York for only twenty-four hours or so before being sent out to other distributing stations of the United States Committee, but two or three hundred remained at examining stations in New York City long enough to require a considerable amount of pediatric attention, which has been provided by groups of physicians from Brooklyn and Manhattan. The response of the Academy to the request to furnish personnel was most gratifying, and the Committee wishes to thank those who have offered to assist when and if needed. .

As the work developed, it became obvious that it would be centered largely on the Eastern seaboard, and that the details could be carried on much better by having the Chairman in New York. Dr. Veeder, who was appointed Acting Chairman, has been succeeded by Dr. Philip Stimson of New York, who has been appointed Chairman of the Committee. Dr. Rustin McIntosh of New York, and Dr. Carl H. Laws of Brooklyn, who have been in charge of the receiving and examining units in their respective cities, have been added to the Academy Committee.

Respectfully submitted,
PHILIP M. STIMSON, Chairman
CARL H. LAWS
RUSTIN MCINTOSH
EDWARDS A. PARK
LENDON SNEDEKER
BORDEN VEEDER
JOSEPH S. WALL.

Report of the Committee on Medical Education:

Undergraduate Education.—In correspondence and in a meeting at Kansas City, the question of the Committee's recommending to the various medical schools a plan for teaching of mental hygiene emanating from the Committee on Mental Health was gone into thoroughly. It was our feeling that the time had not yet arrived when formal recommendations on this very controversial subject could be made by an educational committee. Our Committee recognizes clearly the need for the inclusion of this item in any well-rounded curriculum; it is conscious of the fact that a large number of schools have already instituted programs of various types and that it would be the part of wisdom to await the experience gained from these various representative schools before presuming to suggest an ideal program. We did agree, however, that a useful purpose would be served if the Committee on Mental Health sent circulars to the various schools to gather such information as was possible on the various experiences, looking forward to the time when the results of various types of program could be made available to all the schools.

Respectfully submitted,
J. A. JOHNSTON, Chairman
ALEXIS HARTMANN
RUSTIN MCINTOSH

Postgraduate Education.—The past year has seen a generally more widespread interest in postgraduate endeavor in most fields of clinical medicine. The Council on Medical Education and Hospitals has been quite active in providing consultation service to postgraduate education committees of state and local societies. Now, most state societies have committees on postgraduate clinical studies. The study of the Council has been gradually extended during this period, and the most recent report[1] constitutes a comprehensive analysis of the situation as far as general postgraduate medical education is concerned. The attention of the Council has been devoted to a general study of all the extramural and short-time intramural courses, and other such special clinical weeks or days as have been developed for the purpose as a refresher influence. The Committee from the Academy has maintained a cooperative contact with the Council on Medical Education and expects to continue to do so.

The Associated Postgraduate State Committee has increased its activity and contemplates during the next year the development of mutually helpful consultation services between committees, a listing of available instructors, and a coordination of effort. The various plans and practices are being critically evaluated so that the best practices may be evolved and there may be a minimum of wasteful activity. The Committee from the Academy is associated with this group.

During the year a very important report was issued by the Commission on Postgraduate Medical Education.[2] This is a really important contribution in this field, and it is very desirable that those of the Academy having committee work, or a special interest in the problems of postgraduate medical education in pediatrics, be familiar with this splendid report.

In the field of pediatrics proper, there have been several interesting trends during the past two years. Perhaps the most interesting of these has been an attempt to find practical ways and means of bringing the general physician into organized medical centers for a period of training or review. The time is spent in residence in an intramural educational activity. Time does not permit a detailed analysis of the various plans which have been attempted, but from reports obtained from persons privileged to enjoy the advantages of these opportunities, it would seem that this phase of postgraduate pediatric education is destined to become an ever more important one. It seems quite likely that eventually such activities will, to some extent, at least, become coordinated with other allied educational programs of a general nature, such as those of the practice of medicine, obstetrics, venereal diseases, etc. Further comment upon this trend in postgraduate education should be withheld for the moment, except to state that this seems to offer a great deal of promise, and because of its present apparently encouraging nature, merits extended and careful consideration.

In most of the states where special pediatric postgraduate or refresher courses of an extramural nature have been given, Academy members have been quite active as state or Academy Committee members and have in one way or another become affiliated with the program. This has had a decidedly beneficial influence on the development of these programs. During the past year, special attention was paid to more diversification of subject matter, so that in those states where repetition had tended to invite lack of interest in the program, it was to a large extent avoided. Better methods of organization and promotion and a better understanding of the objectives of the programs resulted in a more widespread utilization by individual physicians of the extramural programs.

One of the important contributions of the extramural refresher courses has developed rather unexpectedly. This is a growing and increasingly prominent tendency on the part of the physicians attending these extramural courses to request information relative to where they may go for more intensive postgraduate work in an intramural program. Accompanying this, there is generally a definitely increased demand on the part of general physicians for short refresher or review courses in organized medical centers. The positive values of this influence are recognized and come somewhat as an unexpected asset of the extramural programs.

Two members of the Academy Committee on Postgraduate Education have been reappointed for a period of three years to the Advisory Committee on Maternal and Child Health Activities of the Children's Bureau. The Committee on Postgraduate Education from the Academy has had a very definite and very strong influence on the plans and practices which have been initiated by the Children's Bureau in regard to postgraduate pediatric education. In this connection, it is also important to point out that the Children's Bureau has continued to take the lead over all other agencies or groups in the promotion of postgraduate pediatric education throughout the United States. Their attitude toward the general physicians, toward the pediatricians, and toward the Academy of Pediatrics continues to be a most wholesome one. Their spirit of cooperation and of willingness to go along the paths advised by the representatives of the Academy has been consistently present and is worthy of most appreciative comment. While time does not permit of a detailed delineation of the activities of the Children's Bureau,[3, 4] the Committee would like to include here a report of some of the outstanding activities, as presented by Dr. Edwin F. Daily, Director of the Division of Maternal and Child Health, United States Children's Bureau.

"At Kipps Bay Health Center in New York City an intensive program has been developed to teach the part-time physicians employed to conduct child health conferences in New York City how this type of medical service can best be provided. Each physician must attend the courses every day for one-half day over a period of one month, and in addition, is given supervised experience in the pediatric services and ward rounds at the New York Hospital. Several of our staff have visited this training center and believe it is rendering an extremely valuable educational service.

At the Astoria Health Center in New York City a course of training is given for all the part-time physicians employed in New York City for school medical service which it is hoped will considerably modify present trends of school medical examination.

The New Jersey State Health Department has budgeted some of their maternal and child health funds to employ a selected group of the Academy members in the state to survey and supervise the child health conferences conducted by local practicing physicians throughout the state. This is a very interesting project which we believe may be followed in many other states if it proves to be a success in New

Jersey. Dr. Nichols has given the State Health Department considerable assistance in planning this service.

In South Carolina, Florida, and West Virginia a portion of their maternal and child health funds are budgeted to pay the stipend and tuition for physicians employed to conduct their well-child conferences to attend the pediatric seminars held in Saluda.

In Connecticut the physicians selected by the State Health Department to conduct child health conferences are required to take an intensive course at one of the three model child health conference centers conducted by leading pediatricians.

In Maryland, a full-time pediatrician on the staff of the State Health Department consults and advises with local physicians and health officers who are conducting child health conferences, and he is also available for clinical consultations with any of the local physicians.

In Vermont, the Director of the Maternal and Child Health Division of the State Health Department teaches the public health aspects of pediatrics to the medical students and also takes the medical students in groups to the child health conferences being conducted nearby.

The North Carolina State Health Department is planning to employ a full-time pediatrician to be assigned for service one-half time at the North Carolina School of Public Health and one-half time directing postgraduate pediatric teaching at Duke University.

The Nebraska State Health Department has employed with their maternal and child health funds a full-time pediatrician who has been assigned to the University of Nebraska to carry out intramural and extramural postgraduate pediatric teaching and also to strengthen undergraduate pediatric education.

In several states where special medical care projects have developed under the maternal and child health program, arrangements have been made for the local physicians to have available consultation services of pediatricians for home or hospital cases.

Kentucky and Michigan have employed full-time pediatricians to visit local medical societies endeavoring to raise the level of pediatric practice in the state and to provide consultation service to local physicians.

The studies of the various factors responsible for every infant death being carried out in several cities and in several states must also be considered an important aspect of pediatric education.

Several western state health departments have recently combined their resources to establish graduate pediatric education in cooperation with the University of California, providing for both intramural and extramural courses.

There are probably many other aspects of the maternal and child health programs which involve pediatric graduate education, but it is almost impossible to go into details of every state program.

In conclusion, the Committee feels that definite advances are being made in the field of postgraduate education as it relates to the general physician and pediatrics. Proper values are being gradually appreciated, and newer practices are gradually being evolved. Of the latter, the one currently attracting the most attention is the trend toward the development and utilization of simplified short refresher courses on an intramural basis in an organized medical center. In this, the most desirable plans to be followed await further observation and application.

REFERENCES

1. Report of Council on Medical Education and Hospitals, American Medical Association, 1940, under title "Graduate Medical Education in the United Statets, Continuation Study for Practicing Physicians in the United States," 1937-1940, p. 23.
2. Report of Commission on Graduate Medical Education, "Graduate Medical Education," University of Chicago Press, 1940, p. 167.
3. Daily, E. F.: Summary of Report on Maternal and Child Health Services, The Child, 5: 1, 1940, Children's Bureau, U. S. Department of Labor, Washington, D. C.
4. Current files, Director, Division Maternal and Child Health, Children's Bureau, U. S. Dept. of Labor, Washington, D. C., 1940.

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Partial Picture of Intramural Postgraduate Work in Pediatrics in the United States and in Canada

During the summer of 1940, in an attempt to get a fairly good picture of the opportunities for intramural postgraduate work in pediatrics in the United States and in Canada, a letter was sent to the heads of the Departments of Pediatrics of

fifty-four of the more outstanding medical schools in the United States and in Canada, asking what was being done by their departments in intramural postgraduate work. Of course, this is not a complete list, but fifty-one answers to these fifty-four letters were received, and in only ten of the schools were there formal intramural courses in pediatrics. And, in some of these chief emphasis was placed on long-term opportunities, such as a whole school year fellowship.

In several of the other schools, there were occasionally one or two lectures, or not much more than that, given in connection with other postgraduate courses. And still further, there were a number of schools planning or thinking seriously of getting under way in the promotion of intramural postgraduate teaching. This, I conclude, indicates the awareness of the need of such work, and also indicates that there is no lack of interest in providing such courses by the various Departments of Pediatrics in the medical schools.

To give specific information regarding the particular schools which do offer postgraduate courses might be worth while, but it is not being done in this brief report since in the letters received there seems to be more or less constant change and modification in the type of courses or work given, indicating that there is a live interest in adapting the type of facilities to the needs. However, it might be worth while to state that this information is available in the hands of the Committee on Postgraduate Education and could be secured if one wished.

The courses offered, where they are available, vary in length from a few days to several weeks where they are made available for larger numbers. Another type of facility in these institutions permits one or more persons to make arrangements for periods of a month to several months, running up to a whole year. All such arrangements of this nature are made, of course, on a purely individual basis.

Regarding the matter of fees for these various courses, if one were interested, it would seem to the Committee best to write directly to the school in which one was interested. This seems true in view of the frequent change and variation in the type and duration of the courses.

Restpectfully submitted,
GEORGE M. LYON, Chairman
HORTON CASPARIS
ADOLPH G. DESANCTIS
HUGH L. DWYER

Report of the Committee on Mental Health:

The Committee considers the teaching of mental health in the Pediatric Departments of the Medical Schools, to medical students, pediatric interns, and residents to be of vital importance to the future of pediatrics. The suggested program for this teaching, which was written by the Committee on Mental Health at the suggestion of the Committee on Education, was sent to the Chiefs of the Pediatric Departments by the Secretary of the Academy this fall. In return, each Pediatric Chief was asked to give his reaction to the suggested program, together with a statement of the amount of teaching done in his department. A summary of these reports will be made later. It is the hope of the Mental Health Committee that this phase of their program will be made a major project of the Academy as a whole.

The Committee has attempted to secure a sponsor for a picture on "The First Three Years of Life."

Articles on various phases of mental health are being written by authoritative authors and published in THE JOURNAL OF PEDIATRICS.

The members of the Mental Health Committee have endeavored to secure the reaction of pediatricians to the increasing number of papers on mental health which have been given at Academy meetings. Almost without exception, fellow members, especially the younger men, expressed a very favorable reaction and gave the opinion that the number of papers on this subject should be increased. The Committee on Mental Health is glad to arrange for round table discussions, panel discussions, and individual papers for any of the meetings.

The Committee would like suggestions from and desires the help of all the members of the Academy, without whom the program cannot be carried out.

Respectfully submitted,
BERT I. BEVERLY, Chairman
C. A. ALDRICH
FREDERICK H. ALLEN
HORTON CASPARIS
BRONSON CROTHERS
GEORGE MOHR
ARTHUR H. PARMELEE
VICTOR E. STORK

Report of the Committee on Nursing Education in Pediatrics:

Your Academy Committee on Nursing Education in Pediatrics is continuing its cooperation with the two committees of the National League of Nursing Education—the Committee on Nursing Education and "the Subcommittee for the Study of Advanced Courses in Pediatric Nursing."

The Committee attempted to arrange a meeting with representatives of State Committees on Nursing Education in Pediatrics during the meeting of Region III in Kansas City last spring. Only one state committee representative planned to attend the Kansas City meeting, so our efforts were of no avail.

Your Academy Committee would like to have a meeting of its members during the Memphis meeting. An effort will also be made to arrange a separate meeting with any state committee representatives who are present.

Respectfully submitted,
MERLIN L. COOPER, Chairman
STANLEY GIBSON
WILLIAM PALMER LUCAS
WILLIAM A. MULHERIN
CHARLES A. WEYMULLER

Report of the Committee on Problems of the Fetus and the Newborn Infant:

The Joint Committee on Problems of the Fetus and the Newborn Infant, which represents the national pediatric and obstetric Societies and which your Committee was instrumental in organizing more than a year ago, met in Washington for a round table conference on Dec. 2, 1939. This Conference was made possible by the Children's Bureau and was attended by several representatives of the Bureau and of other organizations, in addition to the members of the Joint Committee. The proceedings of this Conference have been mimeographed and are in the hands of the Committee members.

Throughout the year the Committee has kept in touch with various communities where programs have been initiated under the auspices of cities, counties, or states in collaboration with local medical societies, looking toward the improvement of the care of the newborn infant or the prematurely born infant. The Committee is studying these plans and awaiting the results of their operation, in the hope of selecting a plan or plans which have proved most effective in local operation and which it can recommend to the American Academy of Pediatrics for general adoption as the most satisfactory means for promoting the welfare of the fetus and the newborn infant. Further trial of the plans now in operation and further study of other possible plans are required before the Committee would feel justified in making such recommendations. In the interim, the Committee would very much appreciate the cooperation of the members of the Academy in submitting plans with which they are familiar and the results of their application.

Your Committee has hoped that desirable recommendations might be drawn up by the Joint Committee, so that obstetricians might have a part in their preparation and so that the recommendations would be referred to the obstetric as well as the pediatric societies. Action by the Joint Committee, however, may be too long deferred and your Committee may wish to submit its own recommendations to the Academy after the study of present plans has been completed.

A resolution is being submitted at this time regarding the pediatric service in connection with the obstetric services of the hospitals of the United States and Canada. The Committee is not primarily concerned with the organization of the medical services in these hospitals, in respect to focusing responsibility for the care of the newborn infant, but rather in having the regular services of pediatricians available to the newborn infant. It believes that it would be unwise to divorce the care of the newborn infant entirely from the sphere of the obstetrician, just as it believes that it is unwise to leave this care entirely to the obstetrician. It recommends, therefore, joint responsibility and close cooperation between pediatricians and obstetricians on the newborn wards of the hospitals from the time of birth. It also urges that joint conferences, at which pediatric problems will be considered, be held regularly in such hospitals. The Committee hopes that the Academy will adopt the resolution presented herewith and that its members will do all that is possible to lead to the acceptance of these principles in their various communities.

Respectfully submitted,
HAROLD C. STUART, Chairman
STEWART H. CLIFFORD
LAURENCE R. DEBUYS

Report of the Committee on School Health and School Health Education:

Your Committee recommends the publication of the report submitted last May, entitled "The Improvement of School Medical Service," with reprints available for distribution to public health and school officials. This report was prepared to explain how school medical service might be improved because, in the opinion of your Committee, pediatricians can influence such service in line with the objectives of the Academy.

Your Committee has approved and promoted the report, "Suggested School Health Policies," which was published in the *Journal of the American Medical Association* and *Hygeia*. Our statement is supplementary to and consistent with "Suggested School Health Policies."

Inquiries and reports from state committees indicate that already a great deal of influence is being exerted by members of the Academy in the development of school health programs in many states. Such states as Illinois, Minnesota, Michigan, Washington, California, and New York have had extensive studies made either by the State Committees themselves, or by others, with the cooperation of our members, or our members have been appointed to important State Committees to guide in the development of policies that will come from the findings of these studies.

There has been considerable extension of school medical and nursing service throughout the country, but in many places this growth is occurring under Education and Health Department auspices where there is need for a clearer understanding of the contribution that might be made by the practicing pediatrician as well as by the pediatrician who guides the official agency.

The American Association for Health, Physical Education, and Recreation has published "A Plan for National Preparedness Through Health, Physical Education and Recreation in Schools and Camps," and an active committee headed by Dr. Jesse F. Williams, Professor at Teachers' College, Columbia University, has drafted a bill that was reported in September to be in the hands of Senator Mead of New York.

The plan proposes to expand physical education work in schools and includes provision for health service and health instruction. While pediatricians are eager to support anything which they feel will result in an improvement in public or private health, they know that all plans for promoting "physical fitness" require medical guidance. It is recommended, therefore, that any legislation or expansion along this line be studied carefully to safeguard against unsound policies and any possible neglect of proper medical guidance.

Respectfully submitted,
HAROLD H. MITCHELL, Chairman
ROCKWELL M. KEMPTON
M. HINES ROBERTS
A. CLEMENT SILVERMAN
CLIFFORD D. SWEET
ARTHUR E. WADE
ESTELLA F. WARNER
LEROY A. WILKES

Report of the Committee on Therapeutics and General Therapeutic Procedures:

The Committee has had no meeting during the year, although Dr. William H. Bradley, a member of the Committee, has been in personal communication with Dr. E. Fullerton Cook, Chairman of the Convention for the Revision of the *United States Pharmacopoeia*, with reference to representation on the Convention for the Revision of the *United States Pharmacopoeia*, and application was filed for representation by the Academy over a year ago.

Dr. Bradley ascertained that the Committee of the Convention for Revision of the *United States Pharmacopoeia* was not favorable to granting pediatric representation in the *United States Pharmacopoeia* Convention. Dr. Cook stated to Dr. Bradley that he would write the President of the American Academy of Pediatrics and suggest the appointment of some of its members to serve in an advisory capacity to the *United States Pharmacopoeia* Committee.

Dr. Bradley says that Dr. Perlman and he both feel that efforts should be continued to secure representation on the *United States Pharmacopoeia* Revision Committee. Dr. Bradley also states that there have been suggestions from several sources that an independent Pediatric Pharmacopoeia should be established. He thinks that such efforts might emanate from the American Academy of Pediatrics.

Dr. H. Harris Perlman, an active member of the Committee, is continuing his investigation on the causes of lead intoxication in infants. He feels reasonably certain that one of the outstanding causes of intoxication from lead is gnawing by infants and children upon lead-painted articles, such as furniture and toys. Dr.

Perlman has written to several manufacturers to find out if a substitute for lead paint is available, or if such a paint could be developed for painting nursery furniture, as well as toys. Dr. Perlman has received encouraging reports from one of the manufacturers of nursery furniture and has also been furnished a list of paint manufacturers who might be interested in supplying a special kind of nonlead-containing paint.

My recommendations to the Academy, if the members consider it wise, are that Dr. Bradley be encouraged to continue his negotiations with the Revision Committee of the *United States Pharmacopoeia* for pediatric representation on this committee; that Dr. H. Harris Perlman be encouraged to continue his labors directed toward finding nontoxic paints for nursery furniture; and that a successor to Dr. Bernard Fantus, deceased, be appointed to the Committee.

I have constructed this report on the basis of the correspondence which I have received from Dr. Bradley and Dr. Perlman, which I am sending with this statement concerning the activities of these members of the Committee.

Respectfully submitted,
ISAAC A. ABT, Chairman
WILLIAM N. BRADLEY
H. H. PERLMAN
LOUIS W. SAUER

Report of the Committee on Vitamins:

The Committee has prepared a pamphlet on vitamins. This pamphlet is a short account of what is known on the following vitamins that is of clinical interest to pediatricians: vitamin A, thiamin, riboflavin, nicotinic acid, ascorbic acid, vitamin D, vitamin E, and vitamin K. The pamphlet will be ready for publication in the near future.

Respectfully submitted,
ALLAN M. BUTLER, Chairman
SAMUEL W. CLAUSEN
FREDERICK F. TISDALL
W. W. WADDELL, JR.

Report of the Council for Pediatric Research:

To be submitted later.

Report on Publicity:

As the last publicity report was made to the Executive Board on May 5, 1940, prior to the meetings of Region III and IV, this summary covers publicity for these meetings as well as general Academy publicity from June up to the present time.

Despite the unprecedented international situation and consequent preoccupation of the press with foreign news at the time of both regional meetings, the local publicity coverage in Kansas City and Seattle newspapers was excellent.

The national press services—Associated Press, United Press and International News Service—made country-wide releases of seven separate stories from the Region III meeting and three from the meeting of Region IV.

In all, we gathered fifty-eight newspaper clippings from the Region III meeting, representing both large and small newspapers from San Jose, Calif., to New York City. From the Region IV meeting, we collected thirty-five clippings that came from both metropolitan and small-town newspapers on the West Coast and in the Middle West. The clippings from each of the meetings have been bound in books and presented to the Academy's Secretary.

In addition to this newspaper publicity, a total of *three hours* of free radio time was secured for the Academy on Kansas City and Seattle stations. Six broadcasts totaling seventy-five minutes of radio time were made by Academy Fellows on Kansas City stations; and seven broadcasts totaling one hour and forty-five minutes of radio time were made in Seattle.

Since these regional meetings, publicity effort has been concentrated mainly on arranging for two Academy features which were released during August by N.E.A. Service to 600 newspapers throughout the country.

The first of these features, written by Dr. Bilderback as President of the American Academy of Pediatrics, stresses the necessity for the medical examination of every child before the opening of school. It is illustrated with a two-column photograph and covers 441 agate lines of newspaper space. To date, seventy-five different newspapers, ranging from the Washington, D. C., *News* to the Albany, Ga., *Herald* have used the article.

The second feature, written by Dr. Beverly as Chairman of the Mental Health Committee of the Academy, explains how parents can give their children the necessary emotional and psychologic preparation for starting to school. It is illustrated with three large photographs and covers 840 agate lines of newspaper space. Although released two weeks after the first feature, thirty-five newspapers in all sections of the country have carried the mental health feature to date.

The clippings from these two features will be forwarded to the Academy's Secretary as they accumulate in our office.

Respectfully submitted,
LAWRENCE H. SELZ.

Report of the Nominating Committee:

Recommendations:

For Vice-President (President-Elect), Dr. Edward C. Mitchell, Memphis, Tenn.
For Chairman of Region II, Dr. Hugh Leslie Moore, Dallas, Texas.

Respectfully submitted,
HORTON CASPARIS, Chairman,
JAY I. DURAND
LEE FORREST HILL
OLIVER STRINGFIELD

Book Reviews

Borrowed Children. Mrs. St. Loe Starchey. The Commonwealth Fund, New York, 1940, pp. 149. Price $0.75.

This is a disappointing book. It is a popular account of some of the problems arising from the evacuation in September, 1940, of over 700,000 children, unaccompanied by their parents, from London and other parts of Great Britain to areas considered safe from attack. Published in London last July, it has been reprinted by the Commonwealth Fund because of present American interest in the problem. Unfortunately, rather than a clear-cut descriptive picture of what took place, the text concerns itself chiefly with specific psychogenic troubles and numerous case histories. Many of these are obviously not specifically the result of the evacuation, but rather were only accentuated by it. The author seems to have been almost fascinated by the problem of enuresis from the number of times it is discussed. Much space is given to reference to the work and writings of Dr. Moody, Medical Director of the London Child Guidance Clinic. To a certain extent, the theme is not the question of evacuation, but rather the importance of the child guidance clinic, and the impression is given that if there were sufficient child guidance clinics, there would be no problem among the evacuated children. This mass evacuation, or "dislocation" as the author aptly calls it, captures the imagination and interest of everyone. It is to be hoped that someone with a more general viewpoint and knowledge and with more understanding will write a more comprehensive account of the evacuation than this fragmentary picture. The matter of psychogenic problems cannot be considered separately from the health, dietetic, educational, and other problems that arose during the evacuation, as they are so interrelated and interdependent. A book concerning the total picture would be much appreciated by workers in the field of child health and welfare.

Tomorrow's Children. Birth Control Federation of America, New York, 1940, pp. 169. Price $0.75.

This is a collection of the papers presented at the Southern Conference on Tomorrow's Children, at Atlanta, Ga., November, 1939, at which a distinguished group of sociologists and economists discussed the problems of children in the South. The changing population in the South, with the economic situation, has led to trends which are of national importance and significance. Poverty, a high birth rate, racial conditions, housing, and soil deterioration are among the factors which create the problem for tomorrow's children. As the meeting was sponsored by the Birth Control Federation of America, the importance of birth control in meeting the problem is stressed.

Child Care and Training. Marion L. Faegre and John E. Anderson. 5th edition. University of Minnesota Press, Minneapolis, 1940, pp. 320. Price $2.50.

A new fifth edition of this well-known text which has deservedly won a permanent place in educational circles has been published. We know of no better book on the general care and training of children. There are no fundamental changes in this fifth edition, except such revisions as keep pace with current knowledge and thought.

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THE JOURNAL OF PEDIATRICS

A MONTHLY JOURNAL DEVOTED TO THE PROBLEMS AND DISEASES OF INFANCY AND CHILDHOOD

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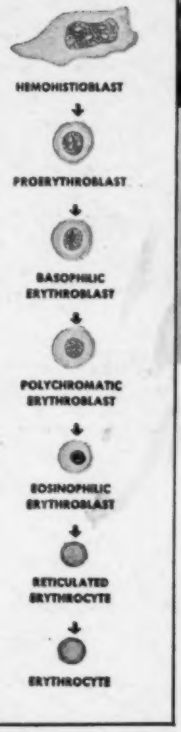
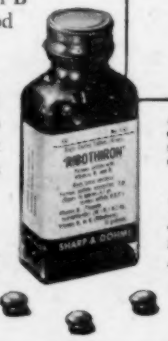


Adequate iron intake and assimilation are necessary for the maturation of erythrocytes.



The usual dose is one tablet after each meal and one on retiring. In bottles of 100 and 1000.

Sharp & Dohme

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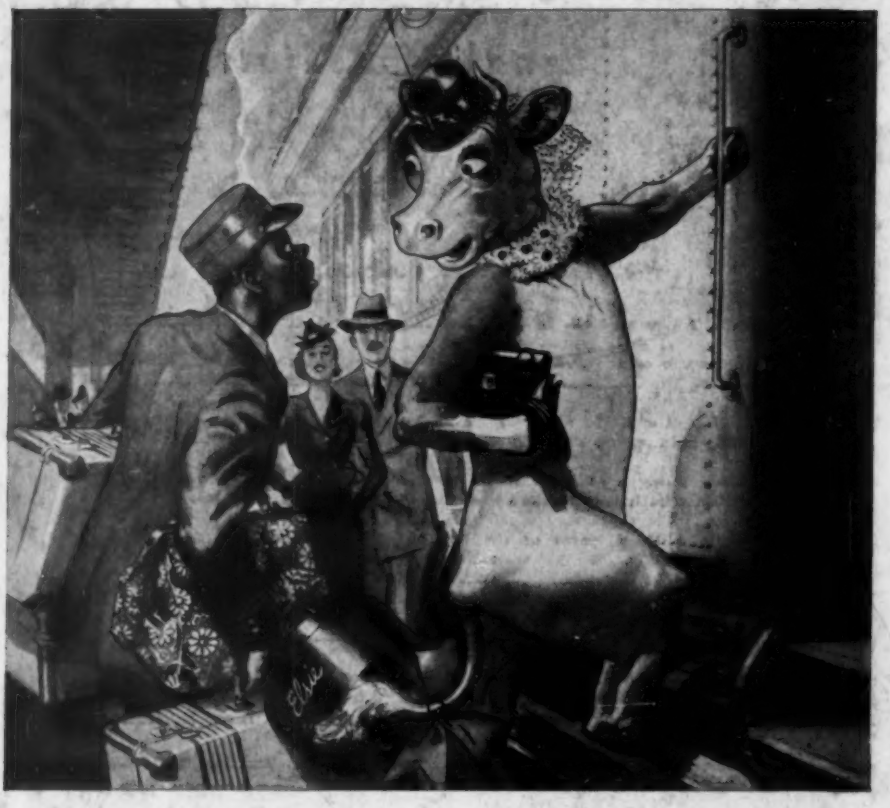

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